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(71)Applicant : ALPS ELECTRIC CO LTD
(72)Inventor : SUGIFUNA MAKOTO
SUGANO TSUTOMU
NABEYA TADASHI
NOMURA KENJI

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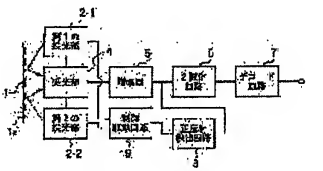
(54) OPTICAL READER

(57)Abstract:
PURPOSE: To provide an optical reader (bar code reader) which can accurately reads a linear recording medium (bar code) 1 even in a regular reflection state.
CONSTITUTION: The optical reader, equipped with plural light projection parts 2-1 and 2-2 which project intermittent light on an information recording surface 1a having the linear recording medium 1 in different directions with a specific timing, a photodetection part 4 which generates a recording medium read signal by photodetecting reflected light from the information recording surface 1a, signal processing parts 5 to 7 which convert a recording medium read signal into a display signal, and a control driving part 9 which drives the light projection parts 2-1 and 2-2, is equipped with a regular reflection detection part 8 which detects the regular reflection state from the recording medium read signal and supplies a regular reflection detection signal obtained at the time of the detection to the control driving part 9, which drives the light projection parts 2-1 and 2-2 in different driving mode according to whether the regular reflection detection signal is supplied or not, thereby removing the regular reflection state.



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		Y	7623－5B		
		R	7623－5B		

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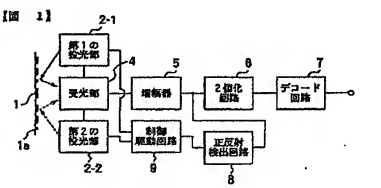
(71)出願人　000010098
アルプス電気株式会社
東京都大田区雪谷大塚町1番7号
(72)発明者　杉船　真
東京都大田区雪谷大塚町1番7号　アルプス電気株式会社内
(72)発明者　菅野　勉
東京都大田区雪谷大塚町1番7号　アルプス電気株式会社内
(72)発明者　鍋谷　端
東京都大田区雪谷大塚町1番7号　アルプス電気株式会社内
(74)代理人　弁理士　武　顕次郎　（外2名）
最終頁に続く

(54)【発明の名称】　光学読取装置

(57)【要約】
【目的】　正反射状態の発生があっても、直ちに、線状記録媒体（バーコード）1の正確な読取りが行える光学読取装置（バーコードリーダー）を提供する。
【構成】　線状記録媒体1を有する情報記録面1ａに異なる方向から所定のタイミングで間歇光を投光する複数の投光部2－1、2－2と、情報記録面1ａの反射光を受光し、記録媒体読取信号を発生する受光部4と、記録媒体読取信号を表示信号に処理変換する信号処理部5～7と、複数の投光部2－1、2－2を駆動する制御駆動部9とを備える光学読取装置において、記録媒体読取信号から正反射状態の発生を検出し、この検出時に得られた正反射検出信号を制御駆動部9に供給する正反射検出部8を備え、制御駆動部9は、正反射検出信号が供給された際に、正反射検出信号が供給されないときと異なる駆動態様で複数の投光部2－1、2－2を制御駆動し、正反射状態の発生を除いている。

【図　1】



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【特許請求の範囲】

【請求項１】　線状記録媒体を有する情報記録面に異なる方向から所定のタイミングで間歇光あるいは連続光を投光する複数の投光部と、前記情報記録面からの反射光を受光し、記録媒体読取信号を発生する受光部と、前記記録媒体読取信号を表示信号に処理変換する信号処理部と、前記複数の投光部を駆動する制御駆動部と、前記記録媒体読取信号から正反射状態の発生を検出し、この検出時に得られた正反射検出信号を前記制御駆動部に供給する正反射検出部とを備え、前記制御駆動部は、前記正反射検出信号が供給された際に、前記正反射検出信号が供給されないときと異なる駆動態様で前記複数の投光部を制御駆動し、前記正反射状態の発生を除くようにしたこと特徴とする光学読取装置。

【請求項２】　前記複数の投光部に対する前記制御駆動部の異なる駆動態様は、前記正反射検出信号が供給されないとき、前記複数の投光部の中の１つの投光部のみを駆動させ、前記正反射検出信号が供給されたとき、前記１つの投光部と異なる他の１つの投光部を駆動することを特徴とする請求項１に記載の光学読取装置。

【請求項３】　前記信号処理部において前記表示信号への処理変換ができない場合に未処理信号を前記制御駆動部に供給する未処理信号発生部を設け、前記制御駆動部は、前記未処理信号が供給されたとき、前記正反射検出信号が供給された場合と同様に、前記１つの投光部と異なる他の１つの投光部を駆動することを特徴とする請求項２に記載の光学読取装置。

【請求項４】　前記受光部が出力する前記記録媒体読取信号に基づき、前記受光部の受光量が規定値以上である場合に光量判定信号を前記制御駆動部に供給する光量判定部を設け、前記制御駆動部は、前記光量判定信号が供給されないとき、前記正反射検出信号が供給された場合と同様に、前記１つの投光部と異なる他の１つの投光部を駆動することを特徴とする請求項２に記載の光学読取装置。

【請求項５】　前記受光部が出力する前記記録媒体読取信号に基づき、前記受光部の受光量が規定値以上である場合に光量判定信号を前記制御駆動部に供給する光量判定部を設け、前記制御駆動部は、前記光量判定信号が供給されないとき、前記複数の投光部をそれぞれ異なるタイミングで間歇駆動させることを特徴とする請求項２に記載の光学読取装置。

【請求項６】　前記光量発生部に平行して前記複数の投光部別の受光量を保持する受光量保持部を設け、前記制御駆動部は、前記光量判定信号が供給されたとき、前記複数の投光部の中から前記正反射検出信号の発生がなく、かつ、前記受光量保持部の保持受光量が最も大きい投光部を選択駆動することを特徴とする請求項５に記載の光学読取装置。

【請求項７】　前記複数の投光部に対する前記制御駆動部の異なる駆動態様は、前記正反射検出信号が供給されないとき、前記複数の投光部の全部を駆動させ、前記正反射検出信号が供給されたとき、前記正反射状態の発生の検出がなくなるまで、前記複数の投光部を１つづつ順番に駆動停止させることを特徴とする請求項１に記載の光学読取装置。

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【請求項８】　前記複数の投光部に対する前記制御駆動部の異なる駆動態様は、前記正反射検出信号が供給されないとき、前記複数の投光部をそれぞれ異なるタイミングで間歇駆動させ、前記正反射検出信号が供給されたとき、正反射状態を発生させている投光部を直ちに駆動停止させることを特徴とする請求項１に記載の光学読取装置。

【請求項９】　前記正反射状態を発生させている投光部が駆動停止されたとき、前記制御駆動部は、残りの投光部の駆動電圧を増大させるように制御することを特徴とする請求項８に記載の光学読取装置。

【請求項１０】　線状記録媒体を有する情報記録面に異なる方向から所定のタイミングで間歇光を投光する複数の投光部と、前記情報記録面からの反射光を受光し、記録媒体読取信号を発生する受光部と、前記記録媒体読取信号を表示信号に変換する信号処理部と、前記複数の投光部を駆動する制御駆動部とを備える光学読取装置において、前記複数の投光部は、それぞれ異なるタイミングで間歇光を投光するように制御駆動され、前記信号処理部は、前記複数の投光部毎に得られる複数の記録媒体読取信号を個別に変換処理する複数の変換処理経路を有しており、これら複数の変換処理経路で変換処理された前記記録媒体読取信号の中の良好な状態の表示信号を選択的に抽出出力させていることを特徴とする光学読取装置。

【請求項１１】　前記信号処理部で抽出される良好な状態の表示信号は、前記複数の記録媒体読取信号をデコード処理した際に、正規にデコード処理が行われた記録媒体読取信号の中の１つであることを特徴とする請求項１０に記載の光学読取装置。

【請求項１２】　前記信号処理部で抽出される良好な状態の表示信号は、前記複数の記録媒体読取信号の正反射状態の発生を検出し、正反射状態の発生が検出されない記録媒体読取信号の中の１つであることを特徴とする請求項１０に記載の光学読取装置。

【請求項１３】　前記線状記録媒体はバーコードであり、前記光学読取装置はバーコードリーダーであることを特徴とする請求項１乃至１２のいずれかに記載の光学読取装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、バーコード等の線状記録媒体を読み取り、表示信号に変換するバーコードリーダー等の光学読取装置に係わり、特に、線状記録媒体の

読み取り時に発生する正反射状態等の不所望な事態により、線状記録媒体が読み取り不能になるのを回避したバーコードリーダー等の光学読取装置に関する。

【0002】

【従来の技術】従来、バーコードを読み取り、この読み取ったバーコードをデコード等の変換処理を行い、必要な表示信号として出力するバーコードリーダーは、バーコードが印刷されている情報記録面に光を投射する投光部と、この情報記録面からの反射光を受光し、バーコード読取信号を発生する受光部と、このバーコード読取信号に対して増幅、2値化、デコード等の変換処理を行い、必要な表示信号を出力させる信号処理部と、投光部を駆動する駆動部とからなっている。

【0003】図13は、かかる既知のバーコードリーダーの構成の一例を示すブロック構成図である。また、図14（a）、（b）は、既知のバーコードリーダーにおけるバーコード読取時の各部の信号状態を示す信号波形図であり、図15は、既知のバーコードリーダーにおける使用状態の一例を示す断面構成図である。

【0004】図13、図15に示されるように、バーコード61は、情報記録面61a上に印刷されている。光放射ダイオード（LED）等からなる投光部62は、バーコードリーダーの読取部（先端部）に近接した位置に配置され、ホトダイオードアレイ等からなる受光部63は、同読取部（先端部）において投光部62のやや後側に配置されるもので、投光部62から投射された光はバーコード61を印刷した情報記録面61aで反射され、レンズ63aで集光された後、ピンホール板63bを介して受光部63に入射するように構成される。受光部63の出力は増幅器64の入力に接続され、増幅器64の出力は2値化回路65の入力に接続される。2値化回路65の出力はデコード回路66の入力に接続され、デコード回路66の出力はバーコードリーダーの出力になる。この場合、増幅器64、2値化回路65、デコード回路66は、信号処理部を構成している。駆動部67は、投光部62を駆動させるための駆動電力を供給する。

【0005】前記構成に係わるバーコードリーダーの動作を図14を用いて説明する。いま、ユーザーがバーコードリーダーを手に持ち、バーコードリーダーの読取部（先端部）をバーコード61を印刷した情報記録面61aに対向させると、投光部62からバーコード61を印刷した情報記録面61aに投射された光は、バーコード61を印刷した情報記録面61aにおいて反射され、この反射光が受光部63に供給される。受光部63は、この反射光を受光してバーコード読取信号を発生させ、このバーコード読取信号を増幅器64、2値化回路65、デコード回路66からなる信号処理部に供給する。信号処理部において、バーコード読取信号は、始めに、増幅器64において所定レベルまで増幅され、次に、2値化

回路65において2値化信号に変換される。続いて、2値化信号は、デコード回路66においてデコードされ、このデコード信号が表示信号としてバーコードリーダーから出力される。この場合、図14（a）に示されるように、図示のようなバーコード61のパターンが読取られたとき、増幅器64の出力側に発生する増幅されたバーコード読取信号波形Aは図示のようにバーコード61に対応したパルス状のものになり、2値化回路65の出力側に発生する2値化信号波形Bは図示のようにバーコード61に対応した2値化信号になる。

【0006】なお、投光部62がバーコード61を印刷した情報記録面61aに投射する光は、連続光であっても、または、所定のタイミングを有する間歇光であってもよい。

【0007】ところで、前記既知のバーコードリーダーにおいては、バーコード61を印刷した情報記録面61aの読取りを行う場合、投光部62からバーコード61を印刷した情報記録面61aに投射した際の光の投射角度、及び、バーコード61を印刷した情報記録面61aから反射されて受光部63に入力される光の入射角度がそれぞれ特定の条件を満たすときに、バーコード61を印刷した情報記録面61aに投射された光の大部分が反射光となって受光部63に入射される状態が生じる、即ち、受光部63の受光量がそれまでよりも異常に増大する状態が生じるようになる。かかる状態は、通常、正反射状態と呼ばれている。そして、この正反射状態が発生すると、受光部63に一度に多量の光が入射されることにより、受光部63から取り出されるバーコード読取信号は、瞬間的に大振幅なものに変化し、次続の増幅器64は、この大振幅のバーコード読取信号の入力により飽和し、図14（b）の信号波形Cに示されるように、バーコード読取信号内のバーコード成分の少なくとも一部が消滅するようになる。続いて、2値化回路65は、かかるバーコード読取信号が入力されると、少なくとも1部のバーコード成分の消滅により、バーコード読取信号の中からバーコード成分を抽出することができなくなり、図14（b）の信号波形Dに示されるように、バーコード成分に対応した2値化信号を発生させることができなくなる。さらに、デコード回路66は、2値化回路65から供給される2値化信号の中に、バーコード成分に対応した2値化信号の少なくとも一部がなくなるため、バーコード成分に対応したデコード信号を発生させることができず、バーコードリーダーから所要の表示信号を出力させることができなくなる。

【0008】このため、前記既知のバーコードリーダーにおいては、かかる正反射状態が発生したとき、バーコード成分の読み取りが行われるまで、即ち、バーコードリーダーから所要の表示信号が出力されるまで、バーコード61を印刷した情報記録面61aの読み取りを繰返し行うようにしていた。

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【０００９】

【発明が解決しようとする課題】しかしながら、前記既知のバーコードリーダーは、正反射状態が発生した場合に、バーコードリーダーから所要の表示信号が出力されるまで、バーコード６１を印刷した情報記録面６１ａの読み取りを繰返し行う必要があるため、正確なバーコード６１の読み取りに多くの時間を要することがあるという問題があり、特に、バーコードリーダーのユーザーが比較的正反射状態を発生し易い状態で、バーコード６１の読取り操作を行うような性癖があるときには、正確にバーコード６１の読み取りを行うために、さらに、多くの時間を要するようになるという問題がある。

【００１０】本発明は、前記問題点を除去するもので、その目的は、正反射状態の発生があったとしても、直ちに、線状記録媒体の正確な読取りを行うことが可能な光学読取装置を提供することにある。

【００１１】

【課題を解決するための手段】前記目的を達成するために、本発明は、線状記録媒体を有する情報記録面に異なる方向から所定のタイミングで間歇光あるいは連続光を投光する複数の投光部と、前記情報記録面からの反射光を受光し、記録媒体読取信号を発生する受光部と、前記記録媒体読取信号を表示信号に処理変換する信号処理部と、前記複数の投光部を駆動する制御駆動部とを備える光学読取装置において、前記記録媒体読取信号から正反射状態の発生を検出し、この検出時に得られた正反射検出信号を前記制御駆動部に供給する正反射検出部を備え、前記制御駆動部は、前記正反射検出信号が供給された際に、前記正反射検出信号が供給されないときと異なる駆動態様で前記複数の投光部を制御駆動し、前記正反射状態の発生を除くようにした第１の手段を備える。

【００１２】また、前記目的を達成するために、本発明は、線状記録媒体を有する情報記録面に異なる方向から所定のタイミングで間歇光を投光する複数の投光部と、前記情報記録面からの反射光を受光し、記録媒体読取信号を発生する受光部と、前記記録媒体読取信号を表示信号に変換する信号処理部と、前記複数の投光部を駆動する制御駆動部とを備える光学読取装置において、前記複数の投光部は、それぞれ異なるタイミングで間歇光を投光するように制御駆動され、前記信号処理部は、前記複数の投光部毎に得られる複数の記録媒体読取信号を個別に変換処理する複数の変換処理経路を有しており、これら複数の変換処理経路で変換処理された前記記録媒体読取信号の中の良好な状態の表示信号を選択的に抽出出力させている第２の手段を備える。

【００１３】

【作用】前記第１の手段において、正反射検出部は、記録媒体読取信号から正反射状態の発生を検出し、この正反射状態の検出時に得られる正反射検出信号を制御駆動部に供給するようにし、また、制御駆動部は、正反射検出信号が供給された際に、正反射検出信号が供給されないときと異なる駆動態様で複数の投光部を制御駆動し、正反射状態の発生を除くようにしている。具体的には、正反射検出信号が供給されないとき、複数の投光部の中の１つの投光部のみを駆動させ、正反射検出信号が供給されたとき、この１つの投光部と異なる他の１つの投光部を駆動させて正反射状態の発生を除くようにしている、または、正反射検出信号が供給されないとき、複数の投光部の全部を駆動させ、正反射検出信号が供給されたとき、正反射状態の発生の検出がなくなるまで、複数の投光部を１つづつ順番に駆動停止させて正反射状態の発生を除くようにしている、もしくは、正反射検出信号が供給されないとき、複数の投光部をそれぞれ異なるタイミングで間歇駆動させ、正反射検出信号が供給されたとき、正反射状態を発生させている投光部を直ちに駆動停止させて正反射状態の発生を除くようにしているものである。

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【００１４】このように、前記第１の手段によれば、正反射検出部で正反射状態の発生が検出されると、制御駆動部はこの正反射状態の発生を除くように複数の投光部を適宜駆動させるようにしているので、正反射状態の発生の有無に係わらず、線状記録媒体を読取って表示信号を発生させることが不能になることはなく、直ちに、線状記録媒体の正確な読取りを行うことが可能な光学読取装置が得られる。

【００１５】また、前記第２の手段において、複数の投光部は、それぞれ異なるタイミングで間歇光を投光するように制御駆動するようにし、信号処理部は、複数の投光部毎に得られる複数の記録媒体読取信号を個別に変換処理する複数の変換処理経路を有し、これら複数の変換処理経路で変換処理された記録媒体読取信号の中の良好な状態の表示信号を選択的に抽出出力させるようにしている。具体的には、複数の記録媒体読取信号をデコード処理した際に、正規にデコード処理が行われた記録媒体読取信号の中の１つの表示信号を選択的に抽出出力させるようにしている、または、複数の録媒体読取信号の正反射状態の発生を検出し、正反射状態の発生が検出されない記録媒体読取信号の中の１つの表示信号を選択的に抽出出力させるようにしているものである。

【００１６】このように、前記第２の手段によれば、複数の記録媒体読取信号の中の良好な状態の表示信号を選択的に抽出出力させるようにしているので、正反射状態の発生の有無にも係わらず、線状記録媒体を読取って表示信号を発生させることが不能になることはなく、直ちに、線状記録媒体の正確な読取りを行うことが可能な光学読取装置が得られる。

【００１７】

【実施例】以下、本発明の実施例を図面を用いて詳細に説明する。

【００１８】図１は、本発明に係わる光学読取装置の第

1の実施例を示す構成図であって、光学読取装置としてバーコードリーダーの例を示すものである。また、図2は、本発明に係わるバーコードリーダーにおける使用状態の一例を示す断面構成図である。

【0019】図1、図2に示されるように、バーコード1は、既知のバーコードと同様に情報記録面1a上に印刷されている。光放射ダイオード（LED）等からなる第1及び第2の投光部2－1、2－2は、バーコードリーダーの読取部（先端部）に比較的近い位置に配置され、第1及び第2の投光部2－1、2－2と読取部（先端部）との間にそれぞれグラスファイバ等の光伝導路3－1、3－2が介在配置される。ホトダイオードアレイ等からなる受光部4は、第1及び第2の投光部2－1、2－2と並ぶように配置されており、第1及び第2の投光部2－1、2－2から得られた光は、光伝導路3－1、3－2を介して外部に投射され、バーコード1を印刷した情報記録面1aで反射される。この反射光は、レンズ4aで集光された後、ピンホール板4bを介して受光部4に入射される。受光部4の出力は増幅器5の入力に接続され、増幅器5の出力は2値化回路6の入力に接続される。2値化回路6の出力はデコード回路7の入力に接続され、デコード回路7の出力はバーコードリーダーの出力端子8に接続される。一方、増幅器5の出力は正反射検出回路8の入力に接続され、正反射検出回路8の出力は制御駆動回路9の入力に接続される。制御駆動回路9の出力はそれぞれ第1及び第2の投光部2－1、2－2に接続される。この場合に、増幅器5、2値化回路6、デコード回路7は、信号処理部を構成している。

【0020】続く、図3は、第1の実施例のバーコードリーダーにおいて、バーコード読取時における各部の信号状態を示す信号波形図であって、（a）は読取られるバーコードパターンの一例、（b）は正反射状態が発生ない場合の増幅されたバーコード読取信号波形、（c）は正反射状態が発生した場合の増幅されたバーコード読取信号波形、（d）は2値化信号波形である。

【0021】ここで、図3を併用し、第1の実施例のバーコードリーダーの動作について説明する。

【0022】まず、第1及び第2の投光部2－1、2－2は、制御駆動回路9の駆動によって、一方の投光部だけが常時動作状態にあるもので、例えば、第1の投光部2－1だけが動作状態にあるとき、第1の投光部2－1は、所定のタイミングで間歇光あるいは連続光を発生する。第1の投光部2－1が発生した光は、光伝導路3－1を介してバーコードリーダーの読取部（先端部）に導かれる。このとき、ユーザーがバーコードリーダーを手に持ち、バーコードリーダーの読取部（先端部）をバーコード1（このバーコード1は、例えば、図3（a）に示すようなパターンを有するものである）を印刷した情報記録面1aに対向させると、第1の投光部2－1から読取部（先端部）に導かれた光は、バーコード1を印刷

した情報記録面1aに投射され、続いて、バーコード1を印刷した情報記録面1aにおいて反射される。この反射光は、レンズ4aで集光された後、ピンホール板4bのピンホールを通して受光部4に供給される。この動作時に、ピンホール板4bは、受光部4に対してピンホールのスキャンを行うので、受光部4にはバーコード1を印刷した情報記録面1aを、バーコード1形成部に沿ってスキャンを行ったと等価な反射光が入射されるようになる。受光部4は、反射光を受光すると、反射光の光量に応じた振幅を持つバーコード読取信号を発生させ、このバーコード読取信号を次続の増幅器5、2値化回路6、デコード回路7からなる信号処理部に供給する。信号処理部において、バーコード読取信号は、始めに、増幅器5において所定レベルにまで増幅され、図3（b）に示されるような波形のバーコード読取信号が得られる。次に、このバーコード読取信号は、2値化回路6において2値化され、図3（d）に示されるような波形の2値化信号に変換される。続いて、この2値化信号は、デコード回路7においてデコードされ、このデコード信号が表示信号としてバーコードリーダーから出力される。

【0023】また、増幅器5の出力側に得られたバーコード読取信号は、正反射検出回路8に供給され、このバーコード読取信号が正反射状態の発生を示すか否かの検出を行っている。そして、正反射検出回路8は、入力されたバーコード読取信号が、例えば、図3（b）に示されるように、正反射状態の発生がないことを検出すると、その検出の行われている間中、制御駆動回路9に正反射非検出信号を供給する。制御駆動回路9は、この正反射非検出信号の供給により、それまで駆動している側の投光部、ここでは第1の投光部2－1の駆動を続行させ、第1の投光部2－1は所定のタイミングの間歇光の発生を継続する。一方、正反射検出回路8は、入力されたバーコード読取信号について、例えば、図3（c）に示されるように、最初の部分で、基準レベルが負方向に大きく変動したことを検出する、即ち、正反射状態の発生があったことを検出すると、直ちに、制御駆動回路9に対し正反射検出信号を供給する。制御駆動回路9は、この正反射検出を受けると、正反射状態の発生原因を除くため、それまで駆動していた投光部、ここでは第1の投光部2－1の駆動を停止させ、同時に、第2の投光部2－2の駆動を開始させて投光部の切替を行う。この投光部の切替により、第1の投光部2－1の間歇光あるいは連続光の発生が停止され、代わりに、第2の投光部2－2が所定のタイミングの間歇光あるいは連続光を発生するようになって、バーコード読取信号に発生した正反射状態は、図3（c）に示されるように、直ちに消去され、基準レベルが変動しないバーコード読取信号が得られる。そして、このバーコード読取信号は、2値化回路6において2値化され、図3（d）に示されるような2

値化信号に変換された後、デコード回路７においてデコードされ、表示信号としてバーコードリーダーから出力されるものである。

【００２４】続く、図４は、第１の実施例のバーコードリーダーにおいて、正反射状態の発生の検出及び投光部の切替の各動作をまとめて示したフローチャートである。

【００２５】このフローチャートを用い、第１の実施例のバーコードリーダーの主要な動作について再度説明する。

【００２６】まず、ステップＳ１において、制御駆動回路９の制御により、一方の投光部、例えば、第１の投光部２－１だけが駆動され、第１の投光部２－１から所定のタイミングの間歇光が発生される。この光は、バーコード１を印刷した情報記録面１ａにおいて反射された後、受光部４に供給される。

【００２７】次に、ステップＳ２において、受光部４に対するスキャンが開始され、受光部４は、バーコード１を印刷した情報記録面１ａをスキャンした光が入射され、この入射光の光量に対応した振幅を持つバーコード読取信号を発生し、このバーコード読取信号を信号処理部に供給する。

【００２８】続く、ステップＳ３において、正反射検出回路８は、増幅されたバーコード読取信号が正反射検知レベルを超えているか否かを判断する。この結果、バーコード読取信号が正反射検知レベルを超えていない（Ｎ）と判断したときは、正反射非検出信号を出力して次のステップＳ４に移行し、一方、バーコード読取信号が正反射検知レベルを超えている（Ｙ）と判断したときは、正反射検出信号を出力して他のステップＳ５に移行する。

【００２９】次いで、ステップＳ４において、制御駆動回路９は、正反射非検出信号を受けると、第１の投光部２－１の駆動を続行する。

【００３０】また、ステップＳ５において、制御駆動回路９は、正反射検出信号を受けると、第１の投光部２－１の駆動を停止させ、代わりに、第２の投光部２－２の駆動を開始する。

【００３１】続く、ステップＳ６において、受光部４に対するスキャンを停止させる。

【００３２】最後に、ステップＳ７において、デコード回路７は、２値化信号のデコードを行い、表示信号を発生させる。

【００３３】このように、第１の実施例によれば、使用中の一方の投光部、例えば、第１の投光部２－１に正反射状態が発生したとき、正反射検出回路８がこの正反射状態の発生を検出し、他方の投光部、例えば、第２の投光部２－２を使用するように切替えるようにしているので、正反射状態は直ちに解消され、常時、正反射状態の発生のない正常な状態においてバーコード読取信号の処理を行うことができ、正反射状態の発生によって、何回もバーコードの読取りを行う必要もない。

【００３４】なお、前記第１の実施例においては、投光部として、第１及び第２の投光部２－１、２－２を用いた例を挙げて説明したが、本実施例において使用可能な投光部の数は２つのものに限られず、３つまたはそれ以上の数の投光部を用いるようにしてもよい。

【００３５】この場合、３つの投光部、例えば、第１、第２、第３の投光部を用いる場合には、常時、１つの投光部、例えば、第１の投光部だけを使用しており、この第１の投光部の使用時に正反射状態が発生が検出されると、第１の投光部の使用に代えて、第２の投光部または第３の投光部を使用するように切替えるものであり、４つの投光部またはそれ以上の数の投光部を用いる場合も全く同様である。

【００３６】ところで、第１の実施例に用いられるバーコードリーダーのように、投光部として、第１及び第２の投光部２－１、２－２の中のいずれか一方の投光部のみを切替えて使用している場合、バーコードの読取り時に、バーコードリーダーを必要以上に傾けた状態で用い、そのときに使用している側の投光部が偶然に下側方向に位置していたとすれば、使用中の投光部からの投射光がバーコードに当たって反射されたとき、その反射光がバーコードリーダーに入射されなくなる。このため、第１の実施例においては、稀に、バーコードリーダーから正常なバーコード読取信号を発生させることができず、デコード回路７において２値化信号のデコードができないという不測の事態を生じることもある。

【００３７】図５は、かかる不測の事態の発生を防ぐ手段を設けた本発明に係わる光学読取装置の第２の実施例を示す構成図であって、光学読取装置としてバーコードリーダーの例を示すものであり、図５においては、図１に示された構成要素と同じ構成要素については同じ符号を付けている。

【００３８】第２の実施例と第１の実施例との構成の違いは、第２の実施例がデコード回路７の出力側に未処理信号発生回路８－１を、正反射検出回路８の出力側と制御駆動回路９の入力側との間にＯＲ回路８－２をそれぞれ設けているのに対して、第１の実施例が未処理信号発生回路８－１やＯＲ回路８－２を具備していない点だけであって、その他に、第２の実施例と第１の実施例との間に構成上の違いはない。

【００３９】第２の実施例の未処理信号発生回路８－１は、入力がデコード回路７の出力に、出力がＯＲ回路８－２の一方の入力にそれぞれ接続され、ＯＲ回路８－２は、他方の入力が正反射検出回路８の出力に、出力が制御駆動回路９の入力にそれぞれ接続されている。

【００４０】第２の実施例において、未処理信号発生回路８－１は、デコード回路７において２値化信号のデコードができないとき、即ち、バーコードの読取り時に、

バーコードリーダーを必要以上に傾けた状態で用いているため、バーコードリーダーで正常なバーコード読取信号を得ることができないときに未処理信号を発生するもので、未処理信号は制御駆動回路９に供給される。そして、制御駆動回路９は、未処理信号が供給されると、使用中の一方の投光部、例えば、第１の投光部２－１の駆動に代えて、他方の投光部、例えば、第２の投光部２－２を駆動するように切替えるので、バーコードリーダーから正常なバーコード読取信号を発生させることができるようになって、デコード回路７において２値化信号のデコードを行うことができるようになる。

【００４１】第２の実施例によれば、バーコードリーダーによるバーコード１の読取りをもう１回行う必要があるが、２回目のバーコード１の読取り時には、バーコードリーダーを必要以上に傾けた状態で用いたとしても、バーコードリーダーから正常なバーコード読取信号を発生させることができ、デコード回路７からデコード出力を発生させることができる。

【００４２】この第２の実施例は、バーコードリーダーによるバーコード１の読取りを２回行っているものであるが、バーコード１の読取りを２回も行うことなく、最初（第１回目）のバーコード１の読取り時に、バーコード１の読取りに適した方の投光部を選択的に駆動できることが望ましい。

【００４３】そこで、図６は、最初（第１回目）のバーコードの読取り時に、読取りに適した投光部を選択的に駆動するようにした本発明に係わる光学読取装置の第３の実施例を示す構成図であって、光学読取装置としてバーコードリーダーの例を示すものであり、図６においても、図１に示された構成要素と同じ構成要素については同じ符号を付けている。

【００４４】第３の実施例と第１の実施例との構成の違いは、第３の実施例が受光部４の出力側と制御駆動回路９の入力側との間に光量判定回路４－１を設けているのに対して、第１の実施例が光量判定回路４－１を具備していない点だけであって、その他に第３の実施例と第１の実施例との間に構成上の違いはない。

【００４５】第３の実施例における光量判定回路４－１は、入力が受光部４の出力に、出力が制御駆動回路９の入力にそれぞれ接続されている。

【００４６】第３の実施例の光量判定回路４－１は、受光部４が出力するバーコード読取信号の振幅に基づき、受光部４で受光された光量（受光量）が規定値以上であることを検出して光量判定信号を発生するもので、光量判定信号は制御駆動回路９に供給される。そして、バーコードリーダーによるバーコードの読取り時に、バーコードリーダーの先端をバーコード１に接触させた後、読取り開始スイッチ（図示なし）を押し、バーコード１の最初（第１回目）のスキャンを開始した時点に、制御駆動回路９は、光量判定信号が未供給であることを検出すると、使用中の投光部、例えば、第１の投光部２－１の駆動に代えて、バーコードリーダーから正常なバーコード読取信号を発生させることができる方の投光部、例えば、第２の投光部２－２の駆動に切り替える。この場合は、最初（第１回目）のスキャン時に、バーコードリーダーが必要以上に傾けた状態で用いられていたとしても、最初（第１回目）のスキャンを始めてから間もなく、バーコードリーダーから正常なバーコード読取信号を発生させることができ、デコード回路７からデコード出力を発生させることができる。

【００４７】また、第３の実施例において、制御駆動回路９は、光量判定信号が未供給であることを検出したとき、使用中の投光部、例えば、第１の投光部２－１の駆動に代えて、第１の投光部２－１及び第２の投光部２－２をそれぞれ異なるタイミングで間歇駆動させるように切り替えてもよい。この場合は、最初（第１回目）のスキャン時に、バーコードリーダーの先端をバーコード１に接触させてスキャンを開始した直後に、バーコードリーダーから正常なバーコード読取信号を発生させることができ、デコード回路７からデコード出力を発生させることができる。

【００４８】このように、第３の実施例によれば、バーコードリーダーによる最初（第１回目）のスキャンが行われた直後に、バーコードの読取りに適した投光部が選択駆動されるので、２回目のスキャンを行うことなく、バーコードリーダーから正常なバーコード読取信号を発生させることができ、デコード回路７からデコード出力を発生させることができる。

【００４９】続く、図７は、第３の実施例において、デコード回路７からのデコード出力の発生頻度を上昇させた本発明に係わる光学読取装置の第４の実施例を示す構成図であって、光学読取装置としてバーコードリーダーの例を示すものであり、図７においても、図１に示された構成要素と同じ構成要素については同じ符号を付けている。

【００５０】第４の実施例と第３の実施例との構成の違いは、第４の実施例が受光部４の出力側と制御駆動回路９の入力側との間に光量判定回路４－１に並列に受光量保持回路４－２を設けているのに対し、第３の実施例がかかる受光量保持回路４－２を備えていない点だけであって、その他に第４の実施例と第３の実施例との間に構成上の違いはない。

【００５１】第４の実施例の受光量保持回路４－２は、入力が受光部４の出力に、出力が制御駆動回路９の入力にそれぞれ接続されている。

【００５２】第４の実施例の受光量保持回路４－２は、受光部４が出力するバーコード読取信号の振幅に基づいて、受光部４で受光された複数の投光部、例えば、第１の投光部２－１及び第２の投光部２－２からの光量（受光量）を個別に保持受光量として保持しているもので、

それぞれの保持受光量は制御駆動回路９に供給される。そして、制御駆動回路９は、光量判定回路４－１から光量判定信号が供給されたとき、使用中の投光部、例えば、第１の投光部２－１の駆動に代えて、正反射検出回路８から正反射検出信号が供給されず、しかも、最も大きな保持受光量を有する投光部、例えば、第２の投光部２－２を選択駆動するように切り替えるので、バーコードリーダーから正常で最適なバーコード読取信号を発生させ、デコード回路７において最適な状態で２値化信号のデコードを行うことができて、デコード回路７からのデコード出力の発生頻度を上昇させることが可能になる。

【００５３】次に、図８は、本発明に係わる光学読取装置の第５の実施例を示す構成図であって、光学読取装置としてバーコードリーダーの例を示すものである。図８においても、図１に示された構成要素と同じ構成要素については同じ符号を付けている。

【００５４】第５の実施例と第１の実施例との構成上の違いは、第５の実施例が入射される２つの反射光にそれぞれ対応した２つのバーコード読取信号を導出しているのに対し、第１の実施例が受光部４で１つのバーコード読取信号を導出している点、第５の実施例が受光部４と増幅器５との間に加算回路１０を接続しているのに対し、第１の実施例が受光部４と増幅器５とを直結している点、第５の実施例が常時第１乃至第２の投光部２－１乃至２－２を同時駆動しているのに対し、第１の実施例が制御駆動回路９によりいずれか１つの投光部を駆動している点だけであって、その他に、第５の実施例と第１の実施例との間に構成上の違いはない。

【００５５】そして、第５の実施例においては、増幅器５、２値化回路６、デコード回路７、加算回路１０が信号処理部を構成している。

【００５６】かかる構成を有する第５の実施例は、次のように動作する。

【００５７】始めに、制御駆動回路９の制御により、第１乃至第２の投光部２－１乃至２－２は、同時駆動され、第１乃至第３の投光部２－１乃至２－２から所定のタイミングで間歇光が同時に発生される。これらの光は、バーコード１を印刷した情報記録面１ａに投射された後、バーコード１を印刷した情報記録面１ａからそれぞれ反射され、２つの反射光として各別に受光部４に入射される。このとき、受光部４は、入射された２つの反射光にそれぞれ対応して２つのバーコード読取信号を発生し、加算回路１０の２つの入力に供給される。加算回路１０は、これら２つのバーコード読取信号を単純加算し、１つの加算バーコード読取信号を発生させる。次いで、加算バーコード読取信号は、２値化回路６で２値化信号に変換された後、デコード回路７でデコードされ、表示信号としてバーコードリーダーから出力される。また、加算バーコード読取信号は、正反射検出回路８にも供給され、加算バーコード読取信号に正反射状態が発生しているか否かを検出する。正反射検出回路８は、加算バーコード読取信号に正反射状態が発生していないことを検出すると、制御駆動回路９に正反射非検出信号を供給し、一方、加算バーコード読取信号に正反射状態が発生していることを検出すると、制御駆動回路９に正反射検出信号を供給する。制御駆動回路９は、正反射非検出信号が供給されると、それまでと同様に第１乃至第２の投光部２－１乃至２－２を同時に駆動するようにし、一方、正反射検出信号が供給されると、第１乃至第２の投光部２－１乃至２－２を１つづつ順番に駆動を停止させるようにする。この場合、第１の投光部２－１の駆動を停止させたとき、加算バーコード読取信号の正反射状態が解消したときには、一定の期間、例えば、このバーコードの読取りが行われている間中、第１の投光部２－１の駆動を停止させる。また、第１の投光部２－１の駆動を停止させても、加算バーコード読取信号の正反射状態が解消しないときは、第１の投光部２－１の駆動を再開させ、代わりに第２の投光部２－２の駆動を停止させる。この第２の投光部２－２の駆動の停止により、加算バーコード読取信号の正反射状態が解消すれば、前と同様に、一定の期間、例えば、このバーコードの読取りが行われている間中、第２の投光部２－２の駆動を停止させ、加算バーコード読取信号の正反射状態を比較的短時間の間に解消させるようにしている。

【００５８】なお、第５の実施例においては、投光部として、第１乃至第２の投光部２－１乃至２－２を用いた例を挙げて説明したが、本実施例において使用可能な投光部の数は２つのものに限られず、３つまたはそれ以上の数の投光部を用いるようにしてもよい。

【００５９】また、第５の実施例において、複数の投光部の中の１つの投光部の駆動が停止されたとき、残りの投光部の駆動電圧を僅かに上昇させ、前記１つの投光部の駆動の停止前と停止後において、加算バーコード読取信号の振幅が略一定になるように制御するようにしてもよい。

【００６０】このように、第５の実施例によれば、複数の投光部２－１乃至２－２の全部を使用しているとき、その中の１つの投光部に正反射状態が発生したとき、正反射検出回路８は、加算バーコード読取信号から正反射状態の発生を検出し、この１つの投光部の駆動が停止され、加算バーコード読取信号の正反射状態が解消されるまで、複数の投光部２－１乃至２－２を１つづつ順番に駆動停止させるようにしているので、発生した正反射状態は比較的短時間内に解消され、常時、正反射状態が発生しない正常な状態でバーコード読取信号の処理を行うことができるもので、正反射状態の発生によって、何回もバーコードの読取りを行う必要がないものである。

【００６１】また、この第５の実施例によれば、複数の投光部２－１乃至２－２からの同時投射に基づき、受光

部４が複数のバーコード読取信号を発生し、これらのバーコード読取信号を加算した加算バーコード読取信号を用い、２値化信号の発生や正反射状態の検出等の信号処理が行われるので、これらの信号処理を高感度で行うことができる。

【００６２】続いて、図９は、本発明に係わる光学読取装置の第６の実施例を示す構成図であって、同じく光学読取装置としてバーコードリーダーの例を示すものである。ここでも、図９においては、図１に示された構成要素と同じ構成要素については同じ符号を付けている。

【００６３】第６の実施例と第１の実施例との構成の違いは、第６の実施例が増幅器５の出力側に第１及び第２のサンプルホールド回路１２、１３を接続し、これら第１及び第２のサンプルホールド回路１２、１３の各出力側にそれぞれ第１及び第２の２値化回路１４、１５を接続し、かつ、第１及び第２の２値化回路１４、１５の出力とデコード回路との間にデコード信号を選択する選択回路１６を設けているに対し、第１の実施例が増幅器５の出力側に２値化回路６を設けている点、第６の実施例が正反射検出回路８の入力を増幅器５の２つの出力（第１のサンプルホールド回路１２及び第２のサンプルホールド回路１３の各入力）に接続しているのに対し、第１の実施例が増幅器５の１つの出力に接続している点、第６の実施例が制御駆動回路９によって常時第１及び第２の投光部２－１乃至２－２を同時駆動し、しかも、第１の投光部２－１と第２の投光部２－２とが異なるタイミングで間歇光を発生するように駆動しているのに対し、第１の実施例がいずれか１つの投光部を駆動している点だけであって、その他に、第６の実施例と第１の実施例との間に構成上の違いはない。

【００６４】ここで、第６の実施例においては、増幅器５、デコード回路７、第１及び第２のサンプルホールド回路１２、１３、第１及び第２の２値化回路１４、１５、選択回路１６が信号処理部を構成している。

【００６５】また、図１０は、第６の実施例のバーコードリーダーにおいて、バーコード読取時における各部の信号状態の一部を示す信号波形図であって、（ａ）は読取られるバーコードパターンの一例、（ｂ）は第１の投光部２－１が発生する間歇光の出力波形、（ｃ）は第２の投光部２－２が発生する間歇光の出力波形、（ｄ）は増幅器５の出力信号波形、（ｅ）は第１のサンプルホールド回路１２の出力波形、（ｆ）は第２のサンプルホールド回路１３の出力波形、（ｇ）は第１の２値化回路１４の２値化信号波形、（ｈ）は第２の２値化回路１５の２値化信号波形である。この場合、図１０においては、２つの点線で示す期間（時間ｔ１からｔ２までの期間）内に第２の投光部２－２側に正反射状態が発生した様子を示している。

【００６６】図１０を用いて、第６の実施例のバーコードリーダーの動作について説明する。

【００６７】まず、制御駆動回路９の制御によって、第１及び第２の投光部２－１、２－２は、同時駆動され、図１０（ｂ）、（ｃ）に示されるように、第１及び第２の投光部２－１、２－２から所定の異なるタイミングで間歇光が発生され、それぞれバーコード１を印刷した情報記録面１ａに投射される。これらの投射光は、バーコード１を印刷した情報記録面１ａにおいてそれぞれ反射され、受光部４に入射される。受光部４は、入射された反射光に対応してバーコード読取信号を発生し、このバーコード読取信号は、増幅器５に供給され、所要のレベルまで増幅される。この場合、バーコード読取信号は、図１０（ｄ）に示されるように、第１及び第２の投光部２－１、２－２から発生される間歇光の反射光が時間的に交互に組み合わされた形のものである。増幅されたバーコード読取信号は、第１及び第２のサンプルホールド回路１２、１３に供給され、第１及び第２の投光部２－１、２－２からの間歇光の発生タイミングに対応してサンプルホールドされ、図１０（ｅ）、（ｆ）に示されるように、第１及び第２のサンプルホールド信号に変換される。次いで、第１及び第２のサンプルホールド信号は、各別に第１及び第２の２値化回路１４、１５に供給され、それぞれ、図１０（ｇ）、（ｈ）に示されるように、第１及び第２の２値化信号に変換される。続いて、第１及び第２の２値化信号は、選択回路１６に供給され、第１及び第２の２値化信号の中の一方の２値化信号が選択される。そして、この選択された２値化信号は、デコード回路７に供給されてデコードされ、表示信号としてバーコードリーダーから出力される。

【００６８】この場合、第１及び第２のサンプルホールド回路１２、１３の出力側に得られたバーコード読取信号は、正反射検出回路８にも供給され、正反射検出回路８において正反射状態が発生しているか否かの検出が行われる。正反射検出回路８は、図１０に図示の時間ｔ１以前または時間ｔ２以後のように、バーコード読取信号に正反射状態が発生していないことを検出すると、制御駆動回路９及び選択回路１６に正反射非検出信号を供給し、一方、図１０に図示の時間ｔ１と時間ｔ２の間のように、バーコード読取信号に正反射状態が発生していることを検出すると、制御駆動回路９及び選択回路１６に正反射検出信号を供給する。

【００６９】制御駆動回路９は、正反射非検出信号が供給されると、それまでと同様に第１及び第２の投光部２－１、２－２を同時に駆動するようにし、一方、正反射検出信号が供給されると、正反射状態が発生したときのタイミングから第１及び第２の投光部２－１、２－２のいずれの側に正反射状態が発生したかを判断し、正反射状態が発生している側の投光部、図１０に図示の例では、第２の投光部２－２の駆動を直ちに停止させ、一定の期間、例えば、このバーコードの読取りが行われている間中、第２の投光部２－２の駆動を停止させて、正反

射状態の発生を解消する。選択回路１６は、正反射非検出信号が供給されると、それまでと同様に第１及び第２の２値化信号の中の一方の２値化信号をデコード回路７に供給し続ける。これに対して、正反射検出信号が供給されると、正反射状態が発生している側の投光部からの間歇光によって得られた２値化信号の選択の停止、図１０に図示の例では、第２の投光部２－２からの間歇光によって得られた第２の２値化信号の選択を停止させる。即ち、選択回路１６は、それまで第１の２値化信号を選択していた場合、第１の２値化信号の選択を続行して、第１の２値化信号をデコード回路７に供給し、一方、それまで第２の２値化信号を選択していた場合、第２の２値化信号の選択を停止し、新たに第１の２値化信号を選択して、第１の２値化信号をデコード回路７に供給する。

【００７０】なお、第６の実施例においては、投光部として、第１及び第２の投光部２－１、２－２を用いた例を挙げて説明したが、本実施例において使用可能な投光部の数は２つのものに限られず、それぞれ異なるタイミングで間歇光を発生する３つまたはそれ以上の数の投光部を用いるようにしてもよい。

【００７１】また、第６の実施例において、複数の投光部の中の１つの投光部の駆動が停止されたとき、残りの投光部の駆動電圧を僅かに上昇させるような制御を行ってもよい。

【００７２】このように、第６の実施例によれば、それぞれ異なるタイミングで間歇光を発生する複数の投光部２－１、２－２を使用し、その中の１つの投光部に正反射状態が発生したとき、正反射検出回路８は、バーコード読取信号から正反射状態の発生を検出し、制御駆動回路９は、正反射状態の発生タイミングから正反射状態の発生原因となる投光部の駆動を直ちに停止させるとともに、正反射状態の影響を受けていない２値化信号をデコードするようにしているので、発生した正反射状態の検出が極めて短時間内に行われ、常時、正反射状態が発生しない正常な状態でバーコード読取信号の処理を行うことができ、正反射状態の発生によって、何回もバーコードの読取りを行う必要がない。

【００７３】続く、図１１は、本発明に係わる光学読取装置の第７の実施例を示す構成図であって、同じく光学読取装置としてバーコードリーダーの例を示すものである。図１１において、図９に示された構成要素と同じ構成要素については同じ符号を付けている。

【００７４】第７の実施例と第６の実施例との構成の違いは、第７の実施例が第１及び第２の２値化回路１４、１５の出力側に直接デコード回路７を接続しているのに対して、第６の実施例が第１及び第２の２値化回路１４、１５の出力側に選択回路１６を介してデコード回路７を接続している点、第７の実施例がデコード回路７に２値化信号のデコード時に正確にデコードが達成されたか否かを判断する機能を持たせているのに対し、第６の実施例がデコード回路７に単に２値化信号のデコードを行う機能を持たせている点だけであって、その他に、第７の実施例と第６の実施例との間に構成上の違いはない。

【００７５】この場合、第７の実施例においては、増幅器５、デコード回路７、第１及び第２のサンプルホールド回路１２、１３、第１及び第２の２値化回路１４、１５が信号処理部を構成している。

【００７６】第７の実施例と第６の実施例の動作上の違いについて、第６の実施例は、第１及び第２の２値化回路１４、１５で得られた第１及び第２の２値化信号の中の１つの２値化信号を選択回路１６において選択し、この選択した２値化信号をデコード回路７でデコードし、表示信号として出力させているのに対し、第７の実施例は、第１及び第２の２値化回路１４、１５で得られた第１及び第２の２値化信号をデコード回路７で個別にデコードするとともに、デコード回路７はこれらの２値化信号の中から正確にデコードされた１つの信号を選択し、表示信号として出力させている点が異なっているだけで、その他の動作は、既に述べた第６の実施例の動作と殆んど同じである。このため、第７の実施例における動作については、以下に述べるデコード回路７の動作の点を除いて、説明を省略する。

【００７７】ところで、第７の実施例のデコード回路７の動作について、さらに詳しく述べると、デコード回路７は、順次入力される第１、第２の２値化信号をそれぞれデコードする際に、デコードした２値化信号を一旦内部メモリに収納させ、一方の２値化信号、例えば、第２の２値化信号が正反射状態の発生によって正確なデコードを行うことができなかったことを検出すると、内部メモリに収納してあるデコードした第１の２値化信号を読み出し、これを表示信号として出力させるようにするか、もしくは、順次入力される第１、第２の２値化信号をそれぞれ高速度でデコードし、これらデコードした２値化信号の中の１つの２値化信号、例えば、第２の２値化信号が正反射状態の発生によって正確なデコードを行うことができなかったことを検出すると、正確なデコードが行われた第１の２値化信号を抽出し、これを表示信号として出力させるようにしているものである。

【００７８】なお、第７の実施例においては、投光部として、第１及び第２の投光部２－１、２－２を用い、これに対応してサンプルホールド回路及び２値化回路として、それぞれ、第１及び第２のサンプルホールド回路１２、１３及び第１及び第２の２値化回路１４、１５を用いた例を挙げて説明したが、本実施例において使用可能な投光部の数、サンプルホールド回路及び２値化回路の数は、それぞれ、２つのものに限られず、それぞれ異なるタイミングで間歇光を発生する３つまたはそれ以上の数の投光部、それに対応して同じく３つまたはそれ以上

の数のサンプルホールド回路及び2値化回路を用いるようにしてもよい。

【0079】このように、第7の実施例によれば、複数の投光部の配置に対応して得られた複数の2値化信号をデコード回路7で順次デコードし、これらデコードした2値化信号の中から正確なデコードを行うことができた2値化信号を表示信号として選択出力するようにしているので、複数の投光部の中のいずれかに正反射状態が発生したとしても、必ず、正確なデコードを行うことができた2値化信号の1つが表示信号として選択出力されるようになり、正反射状態の発生によって、何回もバーコードの読取りを行う必要がないものである。

【0080】次いで、図12は、本発明に係わる光学読取装置の第8の実施例を示す構成図であって、同じく光学読取装置としてバーコードリーダーの例を示すものである。ここでも、図12において、図9に示された構成要素と同じ構成要素については同じ符号を付けている。

【0081】第8の実施例と第6の実施例との構成の違いは、第8の実施例が第1及び第2の2値化回路14、15の出力側に直接選択回路16を接続しているのに対し、第6の実施例が第1及び第2のサンプルホールド回路12、13の出力側にそれぞれ2値化回路14、15を介して選択回路16を接続している点、第8の実施例が正反射検出回路8の出力を選択回路16の制御端だけに接続しているのに対し、第6の実施例が正反射検出回路8の出力を制御駆動回路9の入力と選択回路16の制御端にそれぞれ接続している点だけであって、その他に、第8の実施例と第6の実施例との間に構成上の違いはない。

【0082】この場合、第8の実施例においては、増幅器5、2値化回路6、デコード回路7、第1及び第2のサンプルホールド回路12、13が信号処理部を構成している。

【0083】かかる構成を有する第8の実施例は、次のような動作を行う。

【0084】制御駆動回路9の制御により、第1及び第2の投光部2－1、2－2は、同時駆動され、第1及び第2の投光部2－1、2－2から所定の異なるタイミングで間歇光が発生され、それぞれバーコード1を印刷した情報記録面1aに投射される。これら投射光は、バーコード1を印刷した情報記録面1aで反射され、受光部4に入射される。受光部4は入射された反射光に対応してバーコード読取信号を発生し、このバーコード読取信号は増幅器5に供給されて所要のレベルまで増幅される。増幅されたバーコード読取信号は、第1及び第2のサンプルホールド回路12、13に供給され、第1及び第2の投光部2－1、2－2からの間歇光の発生タイミングに対応してサンプルホールドされ、第1及び第2のサンプルホールド信号に変換される。次いで、第1及び第2のサンプルホールド信号は、選択回路16に供給され、それらの中の1つの信号が選択された後、2値化回路6に供給され、2値化信号に変換される。続いて、この2値化信号は、デコード回路7に供給されてデコードされ、表示信号としてバーコードリーダーから出力される。

【0085】この場合、第1及び第2のサンプルホールド回路12、13の出力側に得られた第1及び第2のサンプルホールド信号は、正反射検出回路8に供給され、正反射検出回路8において正反射状態が発生しているか否かの検出が行われる。正反射検出回路8は、第1及び第2のサンプルホールド信号に正反射状態が発生していないことを検出すると、選択回路16に正反射非検出信号を供給し、一方、第1及び第2の信号に正反射状態が発生していることを検出すると、選択回路16に正反射検出信号を供給する。選択回路16は、正反射非検出信号が供給されると、それまでと同様に第1及び第2のサンプルホールド信号の中の一方の信号を2値化回路6に供給し続ける。これに対して、第1及び第2のサンプルホールド信号の中の一方の信号、例えば、第2のサンプルホールド信号に正反射検出信号が供給されると、それまで第1のサンプルホールド信号を選択していた場合、第1のサンプルホールド信号の選択を続行して、第1のサンプルホールド信号を2値化回路6に供給し、また、それまで第2のサンプルホールド信号を選択していた場合、第2のサンプルホールド信号の選択を停止し、新たに第1のサンプルホールド信号を選択し、次続の2値化回路6に供給する。

【0086】なお、第5の実施例においては、投光部として、第1及び第2の投光部2－1、2－2を用い、それに対応して第1及び第2のサンプルホールド回路12、13を用いた例を挙げて説明したが、本実施例において使用可能な投光部の数、それに対応するサンプルホールド回路の数は2つのものに限られず、それぞれ異なるタイミングで間歇光を発生する3つまたはそれ以上の数の投光部、及び、3つまたはそれ以上の数のサンプルホールド回路を用いるようにしてもよい。

【0087】このように、第5の実施例によれば、それぞれ異なるタイミングで間歇光を発生する複数の投光部2－1、2－2を使用し、その中の1つの投光部に正反射状態が発生したとき、正反射検出回路8は、第1及び第2のサンプルホールド信号から正反射状態の発生を検出し、正反射状態の影響を受けていないサンプルホールド信号を2値化、それに続くデコードを行うようにしているので、常時、発生した正反射状態の影響を受けずに、所要の表示信号を導出させることができる。また、第5の実施例によれば、バーコードの読取りの途中において、正反射状態の発生が検出されると、再度、バーコードの読取りを行う必要があるが、このバーコードの再読取りも単に1回行うだけで足り、何回もバーコードの読取りを行う必要がない。

【００８８】以上の各実施例においては、光学読取装置がバーコードリーダーである場合を例に挙げて説明したが、本発明による光学読取装置はバーコードリーダーである場合に限られるものではなく、バーコードのように線状記録媒体を読取るものであれば、他の類似の装置にも適用できることは勿論である。

【００８９】

【発明の効果】以上説明したように、請求項１乃至９に記載の発明においては、正反射検出部８は、正反射状態の発生の検出時に得られる正反射検出信号を制御駆動部９に供給し、制御駆動部９は、正反射検出信号の供給時と非供給時とにおいて異なる駆動態様で複数の投光部２－１、２－２を制御駆動し、正反射状態の発生を除いている。そして、具体的には、正反射検出信号の非供給時に、複数の投光部２－１、２－２の中の１つの投光部のみを駆動させ、正反射検出信号の供給時に、この１つの投光部と異なる他の１つの投光部を駆動させて正反射状態の発生を除いている、または、正反射検出信号の非供給時に、複数の投光部２－１、２－２の全部を駆動させ、正反射検出信号の供給時に、正反射状態の発生の検出がなくなるまで、複数の投光部２－１、２－２を１つづつ順番に駆動停止させ、正反射状態の発生を除いている、もしくは、正反射検出信号の非供給時に、複数の投光部２－１、２－２をそれぞれ異なるタイミングで間歇駆動させ、正反射検出信号の供給時に、正反射状態を発生原因となっている投光部を直ちに駆動停止させ、正反射状態の発生を除いている。

【００９０】このように、請求項１乃至９に記載の発明によれば、正反射検出部８で正反射状態の発生が検出されると、制御駆動部９はこの正反射状態の発生を除くように複数の投光部２－１、２－２を適宜駆動しているので、正反射状態の発生の有無に係わらず、線状記録媒体を読取って表示信号を発生させることが不能になることはなく、直ちに、線状記録媒体の正確な読取りを行うことが可能になるという効果がある。

【００９１】この場合、請求項３に記載の発明によれば、バーコードリーダーを必要以上に傾けた状態で用い、１回目のスキャンでバーコードの読取りができなかったとしても、２回目のスキャンでバーコードリーダーから正常なバーコード読取信号を発生させ、デコード回路７からデコード出力を発生できるという効果があり、請求項４乃至５に記載の発明によれば、第１回目のスキャン時に、バーコードリーダーが必要以上に傾けた状態で用いたとしても、バーコードリーダーから正常なバーコード読取信号を発生させ、デコード回路７からデコード出力を発生できるという効果があり、請求項６に記載の発明によれば、バーコードリーダーから正常で最適なバーコード読取信号を発生させ、デコード回路７において最適な状態で２値化信号のデコードを行うことができ、デコード回路７からのデコード出力の発生頻度を上昇させることができるという効果がある。

【００９２】また、請求項１０乃至１２に記載の発明においては、複数の投光部２－１、２－２は、それぞれ異なるタイミングで間歇光を投射し、信号処理部５乃至７、１１乃至１６は、複数の投光部毎に得られる複数の記録媒体読取信号を個別に変換処理する複数の変換処理経路を有し、これら複数の変換処理経路で変換処理された記録媒体読取信号の中の良好な状態の表示信号を選択的に抽出出力している。そして、具体的には、複数の記録媒体読取信号をデコード処理した際に、正規にデコード処理が行われた記録媒体読取信号の中の１つの表示信号を選択的に抽出出力している、または、複数の記録媒体読取信号の正反射状態の発生を検出し、正反射状態の発生が検出されない記録媒体読取信号の中の１つの表示信号を選択的に抽出出力している。

【００９３】このように、請求項１０乃至１２に記載の発明によれば、複数の記録媒体読取信号の中の良好な状態の表示信号を選択的に抽出出力しているので、正反射状態の発生の有無にも係わらず、線状記録媒体を読取って表示信号を発生させることが不能になることはなく、直ちに、線状記録媒体の正確な読取りを行うことが可能になるという効果がある。

【図面の簡単な説明】

【図１】本発明に係わる光学読取装置の第１の実施例を示す構成図である。

【図２】本発明に係わるバーコードリーダーにおける使用状態の一例を示す断面構成図である。

【図３】図１に図示の第１の実施例において、バーコード読取時における各部の信号状態を示す信号波形図である。

【図４】図１に図示の第１の実施例において、正反射状態の発生の検出及び投光部の切替の各動作をまとめて示したフローチャートである。

【図５】本発明に係わる光学読取装置の第２の実施例を示す構成図である。

【図６】本発明に係わる光学読取装置の第３の実施例を示す構成図である。

【図７】本発明に係わる光学読取装置の第４の実施例を示す構成図である。

【図８】本発明に係わる光学読取装置の第５の実施例を示す構成図である。

【図９】本発明に係わる光学読取装置の第６の実施例を示す構成図である。

【図１０】図９に図示の第６の実施例において、バーコード読取時における各部の信号状態の一部を示す信号波形図である。

【図１１】本発明に係わる光学読取装置の第７の実施例を示す構成図である。

【図１２】本発明に係わる光学読取装置の第８の実施例を示す構成図である。

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【図１３】既知のバーコードリーダーの構成の一例を示すブロック構成図である。

【図１４】既知のバーコードリーダーにおけるバーコード読取時の各部の信号状態を示す信号波形図である。

【図１５】既知のバーコードリーダーにおける使用状態の一例を示す断面構成図である。

【符号の説明】

1　バーコード
1ａ　情報記録面
2－1　第１の投光部
2－2　第２の投光部
3－1、3－2　光伝導路
4　受光部
4ａ　レンズ
4ｂ　ピンホール板

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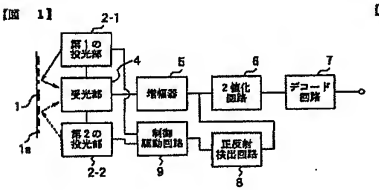
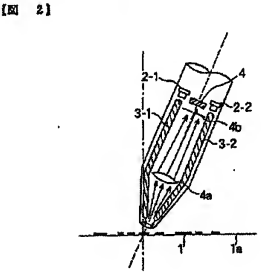
4－1　光量判定回路
4－2　受光量保持回路
5　増幅器
6　２値化回路
7　デコード回路
8　正反射検出回路
8－1　未処理信号発生回路
9　制御駆動回路
10　１０　加算回路
１２　第１のサンプルホールド回路
１３　第２のサンプルホールド回路
１４　第１の２値化回路
１５　第２の２値化回路
１６　選択回路

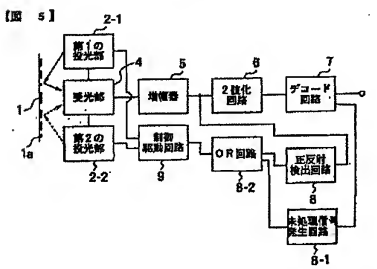
【図１】



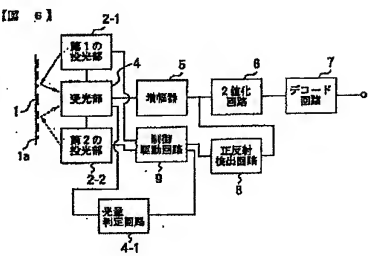
【図２】



【図５】

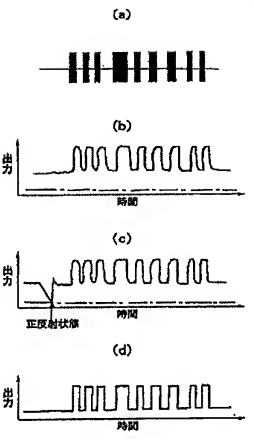


【図６】



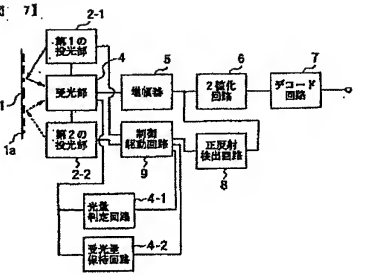
【図3】

【図 3】



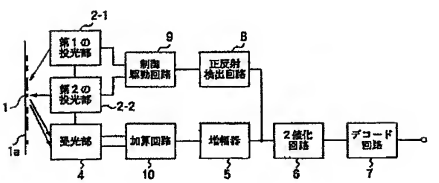
【図7】

【図 7】



【図8】

【図 8】

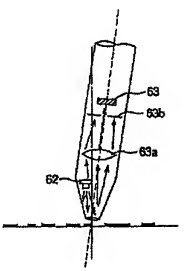


【図13】

【図１３】

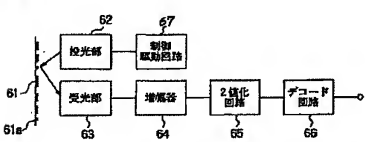
【図15】

【図 15】



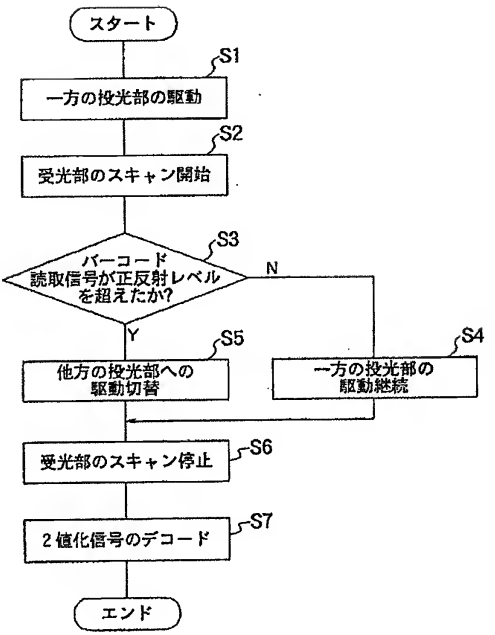
【図18】

【図 18】



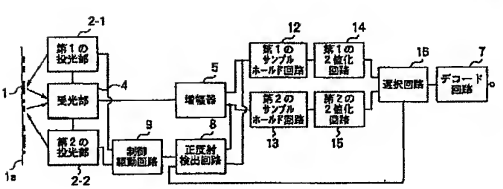
【図４】

【図　4】


スタート
S1
一方の投光部の駆動
S2
受光部のスキャン開始
S3
バーコード
読取信号が正反射レベル
を超えたか?
N
Y
S5
他方の投光部への
駆動切替
S4
一方の投光部の
駆動継続
受光部のスキャン停止
S6
２値化信号のデコード
S7
エンド

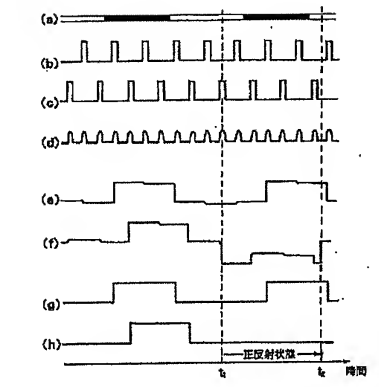
【図９】

【図 9】


2-1
第１の
投光部
1
受光部
4
第２の
投光部
2-2
1a
9
制御
駆動回路
8
正反射
検出回路
5
増幅器
12
第１の
サンプル
ホールド回路
13
第２の
サンプル
ホールド回路
14
第１の
２値化
回路
15
第２の
２値化
回路
16
選択回路
7
デコード
回路
6

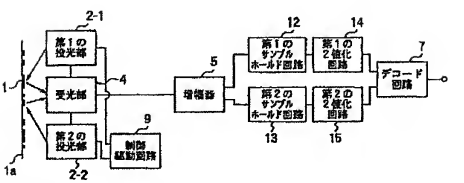
【図１０】

【図１０】



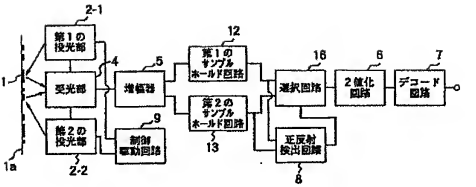
【図１１】

【図１１】



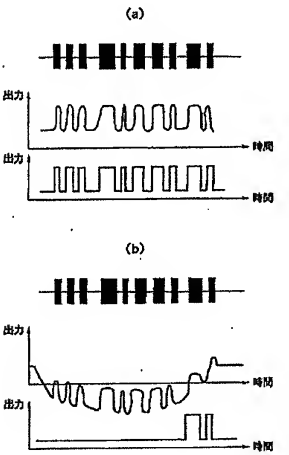
【図12】

【図12】



【図14】

【図14】



フロントページの続き

(72)発明者　野村　憲司
東京都大田区雪谷大塚町1番7号　アルプス電気株式会社内

Machine Translation

Japanese Patent - Publication No. 08-129597

PRIOR ART

[Description of the Prior Art]Conventionally the bar code reader which reads a bar code, performs conversion processes, such as decoding, and outputs this read bar code as a required status signal, The light projection part which projects light on the information storage side where the bar code is printed, and the light sensing portion which receives the catoptric light from this information storage side, and generates a bar code read signal, Conversion processes, such as amplification, binary-izing, and decoding, are performed to this bar code read signal, and it consists of a signal processing part which makes a required status signal output, and an actuator which drives a light projection part.

[0003]Drawing 13 is a block lineblock diagram showing an example of the composition of this known bar code reader. Drawing 14 (a) and (b) is a signal waveform diagram showing the signal state of each part at the time of bar code reading in a known bar code reader, and drawing 15 is a section lineblock diagram showing an example of the condition of use in a known bar code reader.

[0004]As shown in drawing 13 and drawing 15, the bar code 61 is printed on the information storage side 61a. The light projection part 62 which consists of a luminous-radiation diode (LED) etc., The light sensing portion 63 which is arranged at the position close to the reading section (tip part) of the bar code reader, and consists of photodiode arrays etc., After being reflected in respect of [61a] the information storage which printed the bar code 61 and being condensed with the lens 63a, the light which is arranged a little at the backside and projected on the light projection part 62 from the light projection part 62 in the reading section (tip part) is constituted so that it may enter into the light sensing portion 63 via the pinhole plate 63b. The output of the light sensing portion 63 is connected to the input of the amplifier 64, and the output of the amplifier 64 is connected to the input of the binarization circuit 65. The output of the binarization circuit 65 is connected to the input of the decode circuit 66, and the output of the decode circuit 66 turns into an output of a bar code reader. In this case, the amplifier 64, the binarization circuit 65, and the decode circuit 66 constitute the signal processing part. The actuator 67 supplies the driving power for making the light projection part 62 drive.

[0005]Operation of the bar code reader concerning said composition is explained using drawing 14. If a user has a bar code reader in a hand and makes the reading section (tip part) of a bar code reader counter the information storage side 61a which printed the bar code 61 now, In the information storage side 61a which printed the bar code 61, the light on which it was projected in the information storage side 61a which printed the bar code 61 from the light projection part 62 is reflected, and this catoptric light is supplied to the light sensing portion 63. The light sensing portion 63 receives this catoptric light, generates a bar code read signal, and supplies this bar code read signal to the signal processing part which consists of the amplifier 64, the binarization circuit

65, and the decode circuit 66. In a signal processing part, first, a bar code read signal is amplified to a predetermined level in the amplifier 64, next is changed into a binary-ized signal in the binarization circuit 65. Then, a binary-ized signal is decoded in the decode circuit 66, and this decoded signal is outputted from a bar code reader as a status signal. In this case, as shown in drawing 14 (a), when the pattern of the bar code 61 like a graphic display is read, The amplified bar code read signal waveform A which is generated in the output side of the amplifier 64 becomes a pulse form thing corresponding to the bar code 61 like a graphic display, and the binary-ized signal wave form B by which it is generated in the output side of the binarization circuit 65 becomes a binary-ized signal corresponding to the bar code 61 like a graphic display.

[0006]Even if the light which the light projection part 62 projects on the information storage side 61a which printed the bar code 61 is continuation light, it may be an intermittent light which has predetermined timing.

[0007]By the way, in said known bar code reader, The degree of angle of projection of the light at the time of projecting on the information storage side 61a which printed the bar code 61 from the light projection part 62, when the information storage side 61a which printed the bar code 61 is read, And when fulfilling the conditions that the degree of incidence angle of the light which is reflected from the information storage side 61a which printed the bar code 61, and is inputted into the light sensing portion 63 is specific respectively, The state where the great portion of light on which it was projected in the information storage side 61a which printed the bar code 61 turns into catoptric light, and it enters into the light sensing portion 63 arises, namely, the state where the light income of the light sensing portion 63 increases unusually till then also in a twist comes to arise. This state is usually called the regular-reflection state. And the bar code read signal which will be taken out from the light sensing portion 63 when a lot of lights enter into the light sensing portion 63 at once if this regular-reflection state occurs, It changes to a large amplitude momentarily thing, and the amplifier 64 of the following ** is saturated by the input of the bar code read signal of this large amplitude, and as shown in the signal wave form C of drawing 14 (b), at least a part of bar code ingredient within a bar code read signal comes to disappear. Then, when this bar code read signal is inputted, the binarization circuit 65 by disappearance of the bar code ingredient of at least one copy. It becomes impossible to generate the binary-ized signal corresponding to a bar code ingredient, as it becomes impossible to extract a bar code ingredient out of a bar code read signal and is shown in the signal wave form D of drawing 14 (b). Since at least a part of binary-ized signal corresponding to a bar code ingredient is lost in the binary-ized signal with which the decode circuit 66 is supplied from the binarization circuit 65, It becomes impossible to generate the decoded signal corresponding to a bar code ingredient, and to make a necessary status signal output from a bar code reader.

[0008]For this reason, in said known bar code reader, When this regular-reflection state occurs, reading of the information storage side 61a which printed the bar code 61 is repeated, and it is made to perform it until reading of a bar code ingredient is performed (i.e., until a necessary status signal is outputted

from a bar code reader).

TECHNICAL FIELD

[Industrial Application]With respect to optical readers, such as a bar code reader which read line recording media, such as a bar code, and is changed into a status signal, this invention according to undesirable situations, such as a regular-reflection state especially generated at the time of reading of a line recording medium. It is related with optical readers, such as a bar code reader which avoided a line recording medium reading and becoming impossible.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]However, said known bar code reader, When a regular-reflection state occurs, until a necessary status signal is outputted from a bar code reader, Since it is necessary to repeat reading of the information storage side 61a which printed the bar code 61, and to perform it, There is a problem that reading of the exact bar code 61 may take much time, and the user of a bar code reader in the state of being comparatively easy to generate a regular-reflection state, especially. When the disposition in which reading operation of the bar code 61 is performed occurs, in order to read the bar code 61 correctly, there is a problem of coming to require much time, further.
[0010]This invention removes said problem, and even if the purpose has generating of a regular-reflection state, there is in providing the optical reader which can perform exact reading of a line recording medium promptly.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]With respect to optical readers, such as a bar code reader which read line recording media, such as a bar code, and is changed into a status signal, this invention according to undesirable situations, such as a regular-reflection state especially generated at the time of reading of a line recording medium. It is related with optical readers, such as a bar code reader which avoided a line recording medium reading and becoming impossible.
[0002]
[Description of the Prior Art]Conventionally the bar code reader which reads a bar code, performs conversion processes, such as decoding, and outputs this read bar code as a required status signal, The light projection part which projects light on the information storage side where the bar code is printed, and the light sensing portion which receives the catoptric light from this information storage side, and generates a bar code read signal, Conversion processes, such as amplification, binary-izing, and decoding, are performed to this bar code read signal, and it consists of a signal processing part which makes a required status signal output, and an actuator which drives a light projection part.
[0003]Drawing 13 is a block lineblock diagram showing an example of the

composition of this known bar code reader. Drawing 14 (a) and (b) is a signal waveform diagram showing the signal state of each part at the time of bar code reading in a known bar code reader, and drawing 15 is a section lineblock diagram showing an example of the condition of use in a known bar code reader.
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[0006]Even if the light which the light projection part 62 projects on the information storage side 61a which printed the bar code 61 is continuation light, it may be an intermittent light which has predetermined timing.
[0007]By the way, in said known bar code reader, The degree of angle of

projection of the light at the time of projecting on the information storage side 61a which printed the bar code 61 from the light projection part 62, when the information storage side 61a which printed the bar code 61 is read, And when fulfilling the conditions that the degree of incidence angle of the light which is reflected from the information storage side 61a which printed the bar code 61, and is inputted into the light sensing portion 63 is specific respectively, The state where the great portion of light on which it was projected in the information storage side 61a which printed the bar code 61 turns into catoptric light, and it enters into the light sensing portion 63 arises, namely, the state where the light income of the light sensing portion 63 increases unusually till then also in a twist comes to arise. This state is usually called the regular-reflection state. And the bar code read signal which will be taken out from the light sensing portion 63 when a lot of lights enter into the light sensing portion 63 at once if this regular-reflection state occurs, It changes to a large amplitude momentarily thing, and the amplifier 64 of the following ** is saturated by the input of the bar code read signal of this large amplitude, and as shown in the signal wave form C of drawing 14 (b), at least a part of bar code ingredient within a bar code read signal comes to disappear. Then, when this bar code read signal is inputted, the binarization circuit 65 by disappearance of the bar code ingredient of at least one copy. It becomes impossible to generate the binary-ized signal corresponding to a bar code ingredient, as it becomes impossible to extract a bar code ingredient out of a bar code read signal and is shown in the signal wave form D of drawing 14 (b). Since at least a part of binary-ized signal corresponding to a bar code ingredient is lost in the binary-ized signal with which the decode circuit 66 is supplied from the binarization circuit 65, It becomes impossible to generate the decoded signal corresponding to a bar code ingredient, and to make a necessary status signal output from a bar code reader.

[0008]For this reason, in said known bar code reader, When this regular-reflection state occurs, reading of the information storage side 61a which printed the bar code 61 is repeated, and it is made to perform it until reading of a bar code ingredient is performed (i.e., until a necessary status signal is outputted from a bar code reader).

[0009]

[Problem(s) to be Solved by the Invention]However, said known bar code reader, When a regular-reflection state occurs, until a necessary status signal is outputted from a bar code reader, Since it is necessary to repeat reading of the information storage side 61a which printed the bar code 61, and to perform it, There is a problem that reading of the exact bar code 61 may take much time, and the user of a bar code reader in the state of being comparatively easy to generate a regular-reflection state, especially. When the disposition in which reading operation of the bar code 61 is performed occurs, in order to read the bar code 61 correctly, there is a problem of coming to require much time, further.

[0010]This invention removes said problem, and even if the purpose has generating of a regular-reflection state, there is in providing the optical reader which can perform exact reading of a line recording medium promptly.

[0011]

[Means for Solving the Problem]Two or more light projection parts in which this invention floodlights intermittent light or continuation light to predetermined timing from a direction which is different in an information storage side which has a line recording medium in order to attain said purpose, In an optical reader provided with a light sensing portion which receives catoptric light from said information storage side, and generates a recording-medium read signal, a signal processing part which does the process conversion of said recording-medium read signal to a status signal, and a control actuator which drives said two or more light projection parts, Detect generating of a regular-reflection state from said recording-medium read signal, have a regular-reflection primary detecting element which supplies a regular-reflection detecting signal acquired at the time of this detection to said control actuator, and said control actuator, When said regular-reflection detecting signal is supplied, the control drive of said two or more light projection parts is carried out in a different drive mode from a time of said regular-reflection detecting signal not being supplied, and it has the 1st means that removed generating of said regular-reflection state.
[0012]In order to attain said purpose, this invention, Two or more light projection parts which floodlight intermittent light to predetermined timing from a direction which is different in an information storage side which has a line recording medium, In an optical reader provided with a light sensing portion which receives catoptric light from said information storage side, and generates a recording-medium read signal, a signal processing part which changes said recording-medium read signal into a status signal, and a control actuator which drives said two or more light projection parts, The control drive of said two or more light projection parts is carried out, and so that intermittent light may be floodlighted to timing different, respectively said signal processing part, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for said two or more light projection parts of every individually, and has 2nd means to carry out the extraction output of the status signal of a good state in said recording-medium read signal by which the conversion process was carried out in a conversion process course of these plurality selectively.
[0013]
[Function]In said 1st means, a regular-reflection primary detecting element detects generating of a regular-reflection state from a recording-medium read signal, The regular-reflection detecting signal acquired at the time of detection of this regular-reflection state is supplied to a control actuator, and when a regular-reflection detecting signal is supplied, a control actuator carries out the control drive of two or more light projection parts in a different drive mode from the time of a regular-reflection detecting signal not being supplied, and he is trying to remove generating of a regular-reflection state. When a regular-reflection detecting signal is not supplied, only one light projection part in two or more light projection parts is made to drive and a regular-reflection detecting signal is specifically supplied, . Make other one different light projection part from this one light projection part drive, and are trying to remove generating of a regular-reflection state. Or when all of two or more light projection parts are made to

drive when a regular-reflection detecting signal is not supplied, and a regular-reflection detecting signal is supplied, until detection of generating of a regular-reflection state is lost, carrying out driving stoppage of two or more one light projection parts of every to turn, and he trying to remove generating of a regular-reflection state, or, When the intermittent drive of two or more light projection parts is carried out to timing different, respectively when a regular-reflection detecting signal is not supplied, and a regular-reflection detecting signal is supplied, he carries out driving stoppage of the light projection part which is generating the regular-reflection state promptly, and is trying to remove generating of a regular-reflection state.

[0014]Thus, since he is trying for a control actuator to make two or more light projection parts drive suitably so that generating of this regular-reflection state may be removed if generating of a regular-reflection state is detected in a regular-reflection primary detecting element according to said 1st means, Irrespective of the existence of generating of a regular-reflection state, it does not become impossible to read a line recording medium and to generate a status signal, and the optical reader which can perform exact reading of a line recording medium promptly is obtained.

[0015]In said 2nd means, two or more light projection parts, Are made to carry out a control drive and so that intermittent light may be floodlighted to timing different, respectively a signal processing part, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for two or more light projection parts of every individually, and is made to carry out the extraction output of the status signal of the good state in the recording-medium read signal by which the conversion process was carried out in the conversion process course of these plurality selectively. . When two or more recording-medium read signals are decoded, it is specifically made to carry out the extraction output of the one status signal in the recording-medium read signal with which decoding was performed regularly selectively. Or it is made to carry out the extraction output of the one status signal in the recording-medium read signal which detects generating of a regular-reflection state of two or more recording-media read signals and with which generating of a regular-reflection state is not detected selectively.

[0016]Thus, since it is made to carry out the extraction output of the status signal of the good state in two or more recording-medium read signals selectively according to said 2nd means, In spite of the existence of generating of a regular-reflection state, it does not become impossible to read a line recording medium and to generate a status signal, and the optical reader which can perform exact reading of a line recording medium promptly is obtained.

[0017]

[Example]Hereafter, the example of this invention is described in detail using a drawing.

[0018]Drawing 1 is a lineblock diagram showing the 1st example of the optical reader concerning this invention, and shows the example of a bar code reader as an optical reader. Drawing 2 is a section lineblock diagram showing an example

of the condition of use in the bar code reader concerning this invention.
[0019]As shown in drawing 1 and drawing 2, the bar code 1 is printed on the information storage side 1a like the known bar code. The 1st and 2nd light projection parts 2-1 that consist of a luminous-radiation diode (LED) etc., and 2-2, It is arranged at the position comparatively near the reading section (tip part) of a bar code reader, and intervention arrangement of the photoconductivity ways 3-1, such as a glass fiber, and 3-2 is carried out, respectively between the 1st and 2nd light projection parts 2-1, and 2-2 and a reading section (tip part). The light sensing portion 4 which consists of photodiode arrays etc. is arranged so that it may rank with the 1st and 2nd light projection parts 2-1 and 2-2.
It is projected on the 1st and 2nd light projection parts 2-1 and the light obtained from 2-2 outside via the photoconductivity way 3-1 and 3-2, and it is reflected in respect of [1a] the information storage which printed the bar code 1.
This catoptric light enters into the light sensing portion 4 via the pinhole plate 4b, after being condensed with the lens 4a. The output of the light sensing portion 4 is connected to the input of the amplifier 5, and the output of the amplifier 5 is connected to the input of the binarization circuit 6. The output of the binarization circuit 6 is connected to the input of the decode circuit 7, and the output of the decode circuit 7 is connected to the output terminal 8 of a bar code reader. On the other hand, the output of the amplifier 5 is connected to the input of the regular-reflection detector circuit 8, and the output of the regular-reflection detector circuit 8 is connected to the input of the control driving circuit 9. The output of the control driving circuit 9 is connected to the 1st and 2nd light projection parts 2-1 and 2-2, respectively. In this case, the amplifier 5, the binarization circuit 6, and the decode circuit 7 constitute the signal processing part.
[0020]Continuing drawing 3 is a signal waveform diagram showing the signal state of each part at the time of bar code reading in the bar code reader of the 1st example, The bar code read signal waveform by which it was amplified when a regular-reflection state generated the bar code read signal waveform by which it was amplified in case an example of the bar code pattern in which (a) is read, and (b) did not have a regular-reflection state in generating, and (c), and (d) are binary-ized signal wave forms.
[0021]Here, drawing 3 is used together and operation of Bako Dolly Dadu of the 1st example is explained.
[0022]First, the 1st and 2nd light projection parts 2-1 and 2-2 always have only one light projection part in an operating state by the drive of the control driving circuit 9, and when only the 1st light projection part 2-1 is in an operating state, as for the 1st light projection part 2-1, intermittent light or continuation light is generated to predetermined timing, for example. The light which the 1st light projection part 2-1 generated is led to the reading section (tip part) of a bar code reader via the photoconductivity way 3-1. At this time, a user has a bar code reader in a hand, and it is the bar code 1 (this bar code 1) about the reading section (tip part) of a bar code reader. for example, the thing which has a pattern as shown in drawing 3 (a) -- it is -- if the printed information storage side 1a is made to counter, the light led to the reading section (tip part) from the 1st light

projection part 2-1, It is reflected in the information storage side 1a which was projected in the information storage side 1a which printed the bar code 1, then printed the bar code 1. This catoptric light is supplied to the light sensing portion 4 through the pinhole of the pinhole plate 4b, after being condensed with the lens 4a. Since the pinhole plate 4b scans a pinhole to the light sensing portion 4 at the time of this operation, equivalent catoptric light comes to enter into the light sensing portion 4 with having scanned the information storage side 1a which printed the bar code 1 along with bar code 1 formation part. If catoptric light is received, the light sensing portion 4 will generate a bar code read signal with the amplitude according to the light volume of catoptric light, and will supply this bar code read signal to the signal processing part which consists of the amplifier 5 of the following **, the binarization circuit 6, and the decode circuit 7. In a signal processing part, a bar code read signal is first amplified by even the predetermined level in the amplifier 5, and a wave-like bar code read signal as shown in drawing 3 (b) is acquired. Next, this bar code read signal is binary-ized in the binarization circuit 6, and is changed into a wave-like binary-ized signal as shown in drawing 3 (d). Then, this binary-ized signal is decoded in the decode circuit 7, and this decoded signal is outputted from a bar code reader as a status signal.

[0023]The bar code read signal acquired by the output side of the amplifier 5 is supplied to the regular-reflection detector circuit 8, and is detecting whether this bar code read signal shows generating of a regular-reflection state. And the regular-reflection detector circuit 8 supplies a regular-reflection non detection signal to the control driving circuit 9, while the detection is performed if it detects that there is no generating of a regular-reflection state as the inputted bar code read signal is shown in drawing 3 (b), for example. The control driving circuit 9 continues the drive of the 1st light projection part 2-1 by supply of this regular-reflection non detection signal the light projection part of the side currently driven till then, and here, and the 1st light projection part 2-1 continues generating of the intermittent light of predetermined timing. On the other hand, the regular-reflection detector circuit 8 is the first portion, as the inputted bar code read signal is shown in drawing 3 (c), for example, Shortly after detecting that it detects having changed reference level sharply to the negative direction, namely, there was generating of a regular-reflection state about it, a regular-reflection detecting signal is supplied to the control driving circuit 9. If this regular-reflection detection is received, in order that it may remove the generation cause of a regular-reflection state, the control driving circuit 9 stops the drive of the 1st light projection part 2-1, simultaneously, makes the drive of the 2nd light projection part 2-2 start, and changes a light projection part [the light projection part and here] where it was driving till then. Generating of the intermittent light of the 1st light projection part 2-1 or continuation light is suspended by the change of this light projection part, Instead, as the regular-reflection state which the 2nd light projection part 2-2 came to generate a predetermined intermittent light or continuation light of timing, and generated in the bar code read signal is shown in drawing 3 (c), it is eliminated promptly, and the bar code read signal with which reference level is not changed is acquired. And this bar code read signal is

binary-ized in the binarization circuit 6, after being changed into a binary-ized signal as shown in drawing 3 (d), is decoded in the decode circuit 7 and outputted from a bar code reader as a status signal.
[0024]Continuing drawing 4 is the flow chart which showed each operation of detection of generating of a regular-reflection state, and a change of a light projection part collectively in the bar code reader of the 1st example.
[0025]Main operations of the bar code reader of the 1st example are again explained using this flow chart.
[0026]First, in Step S1, by control of the control driving circuit 9, one light projection part 2-1, for example, the 1st light projection part, drives, and the intermittent light of predetermined timing is generated from the 1st light projection part 2-1. This light is supplied to the light sensing portion 4, after being reflected in the information storage side 1a which printed the bar code 1.
[0027]Next, in Step S2, the scan to the light sensing portion 4 begins, and the light sensing portion 4, The light which scanned the information storage side 1a which printed the bar code 1 enters, a bar code read signal with the amplitude corresponding to the light volume of this incident light is generated, and this bar code read signal is supplied to a signal processing part.
[0028]In continuing Step S3, the regular-reflection detector circuit 8 judges whether the amplified bar code read signal is over regular-reflection detection levels. As a result, when a bar code read signal judges it as (N) which has not exceeded regular-reflection detection levels, A regular-reflection non detection signal is outputted, it shifts to the following step S4, when it is judged as (Y) in which the bar code read signal is over regular-reflection detection levels on the other hand, a regular-reflection detecting signal is outputted, and it shifts to other step S5.
[0029]Subsequently, in step S4, the control driving circuit 9 will continue the drive of the 1st light projection part 2-1, if a regular-reflection non detection signal is received.
[0030]In Step S5, if a regular-reflection detecting signal is received, the control driving circuit 9 will stop the drive of the 1st light projection part 2-1, and will start the drive of the 2nd light projection part 2-2 instead.
[0031]The continuing scan of on Step S6 and as opposed to the light sensing portion 4 is stopped.
[0032]Finally, in Step S7, the decode circuit 7 decodes a binary-ized signal and generates a status signal.
[0033]Thus, when a regular-reflection state occurs in one light projection part 2-1 in use, for example, the 1st light projection part, according to the 1st example, Since he is trying to change so that the regular-reflection detector circuit 8 may detect generating of this regular-reflection state and may use the light projection part 2-2 of another side, for example, the 2nd light projection part, It needs to be canceled promptly, and the regular-reflection state can process a bar code read signal in the normal state where there is always no generating of a regular-reflection state, and does not need to read a bar code by generating of a regular-reflection state repeatedly.
[0034]Although the example using the 1st and 2nd light projection parts 2-1 and

2-2 as a light projection part was given and explained, the number of usable light projection parts is not restricted to two things, but it may be made to use the light projection part of the number beyond three or it in this example in said 1st example.
[0035]In this case, in using three light projection parts, for example, the 1st, 2nd, and 3rd light projection part, it is always using one light projection part, for example, the 1st light projection part.
It is also completely the same as if generating is detected, when a regular-reflection state will replace with use of the 1st light projection part, it will change so that the 2nd light projection part or 3rd light projection part may be used and will use four light projection parts or the light projection part of the number beyond it at the time of use of this 1st light projection part.

[0036]By the way, like the bar code reader used for the 1st example, When using it as a light projection part, changing only the 1st and 2nd light projection parts 2-1 and the light projection part of either of 2-2, Supposing the light projection part of the side which is used at the time of reading of a bar code where a bar code reader is leaned more than needed, and is then used is located in the bottom direction by chance, When the incident light from a light projection part in use is reflected in a bar code, the catoptric light stops entering into a bar code reader. For this reason, in the 1st example, rarely, a normal bar code read signal may be generated and the unexpected situation where decoding of a binary-ized signal cannot be performed in the decode circuit 7 may be produced from a bar code reader.
[0037]Drawing 5 is a lineblock diagram showing the 2nd example of the optical reader concerning this invention which formed the means which prevents generating of this unexpected situation, and shows the example of a bar code reader as an optical reader.
In drawing 5, the same numerals are attached about the same component as the component shown in drawing 1.

[0038]The difference of composition between the 2nd example and the 1st example, As opposed to the 2nd example having established the unsettled signal generating circuit 8-1 for OR circuit 8-2 in the output side of the decode circuit 7, respectively between the output side of the regular-reflection detector circuit 8, and the input side of the control driving circuit 9, The 1st example is only the point of providing neither the unsettled signal generating circuit 8-1 nor OR circuit 8-2, in addition there is no constitutional difference between the 2nd example and the 1st example.
[0039]In the unsettled signal generating circuit 8-1 of the 2nd example, an input is connected to the output of the decode circuit 7, an output is connected to one input of OR circuit 8-2, respectively, the input of another side is connected to the output of the regular-reflection detector circuit 8, and, as for OR circuit 8-2, the output is connected to the input of the control driving circuit 9, respectively.
[0040]In the 2nd example, the unsettled signal generating circuit 8-1, Since the bar code reader is used in the state where it leaned more than needed, at the

time of reading of a bar code when decoding of a binary-ized signal cannot be performed in the decode circuit 7 namely, When a normal bar code read signal cannot be acquired with a bar code reader, an unsettled signal is generated, and an unsettled signal is supplied to the control driving circuit 9. And since the control driving circuit 9 will be changed so that it may replace with the drive of one light projection part 2-1 in use, for example, the 1st light projection part, and the light projection part 2-2 of another side, for example, the 2nd light projection part, may be driven if an unsettled signal is supplied, From a bar code reader, a normal bar code read signal can be generated now, and a binary-ized signal can be decoded now in the decode circuit 7.
[0041]According to the 2nd example, it is necessary to read the bar code 1 by a bar code reader once again but, and. Even if it uses a bar code reader in the state where it leaned more than needed, at the time of reading of the 2nd bar code 1, a normal bar code read signal can be generated from a bar code reader, and a decode output can be generated from the decode circuit 7.
[0042]Although this 2nd example is reading the bar code 1 by a bar code reader twice, It is desirable at the time of reading of the first (the 1st time) bar code 1 that the light projection part of a direction suitable for reading of the bar code 1 can be driven selectively, without reading the bar code 1 also twice.
[0043]Then, at the time of reading of the first (the 1st time) bar code, drawing 6 is a lineblock diagram showing the 3rd example of the optical reader concerning this invention it was made to drive a light projection part suitable for reading selectively, and shows the example of a bar code reader as an optical reader. Also in drawing 6, the same numerals are attached about the same component as the component shown in drawing 1.

[0044]The difference of composition between the 3rd example and the 1st example, To the 3rd example having formed the light volume decision circuit 4-1 between the output side of the light sensing portion 4, and the input side of the control driving circuit 9, the 1st example is only the point of not providing the light volume decision circuit 4-1, in addition there is no constitutional difference between the 3rd example and the 1st example.
[0045]In the light volume decision circuit 4-1 in the 3rd example, an input is connected to the output of the light sensing portion 4, and the output is connected to the input of the control driving circuit 9, respectively.
[0046]The light volume decision circuit 4-1 of the 3rd example detects that the light volume (light income) received by the light sensing portion 4 is beyond default value based on the amplitude of the bar code read signal which the light sensing portion 4 outputs, and generates a light volume decision signal, and a light volume decision signal is supplied to the control driving circuit 9. And after contacting the tip of a bar code reader to the bar code 1 at the time of reading of the bar code by a bar code reader, When a reading start switch (with no graphic display) is pushed and the scan of the beginning (the 1st time) of the bar code 1 is started, the control driving circuit 9, If it detects not having supplied a light volume decision signal, it will replace with the drive of the light projection part 2-1 in use, for example, the 1st light projection part, and will change from a bar code

reader to the drive of the light projection part 2-2 of a direction which can generate a normal bar code read signal, for example, the 2nd light projection part. In this case, though the bar code reader was used in the state where it leaned more than needed, at the time of the first (the 1st time) scan, After beginning the first (the 1st time) scan, a normal bar code read signal can be soon generated from a bar code reader, and a decode output can be generated from the decode circuit 7.

[0047]In the 3rd example, the control driving circuit 9, When it detects not having supplied a light volume decision signal, it may replace with the drive of the light projection part 2-1 in use, for example, the 1st light projection part, and it may change so that the intermittent drive of the 1st light projection part 2-1 and 2nd light projection part 2-2 may be carried out to timing different, respectively. In this case, immediately after contacting the tip of a bar code reader to the bar code 1, and starting a scan at the time of the first (the 1st time) scan, a normal bar code read signal can be generated from a bar code reader, and a decode output can be generated from the decode circuit 7.

[0048]Thus, since selection driving of the light projection part which was suitable for reading of a bar code immediately after performing the first (the 1st time) scan by a bar code reader is carried out according to the 3rd example, Without performing the 2nd scan, a normal bar code read signal can be generated from a bar code reader, and a decode output can be generated from the decode circuit 7.

[0049]In the 3rd example, continuing drawing 7 is a lineblock diagram showing the 4th example of the optical reader concerning this invention which raised the occurrence frequency of the decode output from the decode circuit 7, and shows the example of a bar code reader as an optical reader.

Also in drawing 7, the same numerals are attached about the same component as the component shown in drawing 1.

[0050]The difference of composition between the 4th example and the 3rd example, As opposed to the 4th example having formed the light income holding circuit 4-2 in parallel with the light volume decision circuit 4-1 between the output side of the light sensing portion 4, and the input side of the control driving circuit 9, It is only a point which is not provided with the light income holding circuit 4-2 which requires the 3rd example, in addition there is no constitutional difference between the 4th example and the 3rd example.

[0051]In the light income holding circuit 4-2 of the 4th example, an input is connected to the output of the light sensing portion 4, and the output is connected to the input of the control driving circuit 9, respectively.

[0052]Based on the amplitude of the bar code read signal which the light sensing portion 4 outputs, the light income holding circuit 4-2 of the 4th example, The light volume (light income) from two or more light projection parts 2-1 received by the light sensing portion 4, for example, the 1st light projection part, and the 2nd light projection part 2-2 is individually held as maintenance light income, and each maintenance light income is supplied to the control driving circuit 9. And when a light volume decision signal is supplied from the light volume decision

circuit 4-1 to the control driving circuit 9, Replace with the drive of the light projection part 2-1 in use, for example, the 1st light projection part, and a regular-reflection detecting signal is not supplied from the regular-reflection detector circuit 8, And since it changes so that selection driving of the light projection part 2-2 which has the biggest maintenance light income, for example, the 2nd light projection part, may be carried out, It becomes possible to generate the normal and optimal bar code read signal from a bar code reader, to be able to decode a binary-ized signal in the optimal state in the decode circuit 7, and to raise the occurrence frequency of the decode output from the decode circuit 7.
[0053]Next, drawing 8 is a lineblock diagram showing the 5th example of the optical reader concerning this invention, and shows the example of a bar code reader as an optical reader. Also in drawing 8, the same numerals are attached about the same component as the component shown in drawing 1.
[0054]The constitutional difference between the 5th example and the 1st example, As opposed to drawing two bar code read signals respectively corresponding to two catoptric light into which the 5th example enters, The point that the 1st example is drawing one bar code read signal by the light sensing portion 4, As opposed to the 5th example having connected the adder circuit 10 between the light sensing portion 4 and the amplifier 5, As opposed to the point that the 1st example has linked the light sensing portion 4 and the amplifier 5 directly, and the 5th example always carrying out the simultaneous drive of the 1st the 2nd light projection part 2-1 thru/or 2-2, The 1st example is only the point of driving any one light projection part by the control driving circuit 9, in addition there is no constitutional difference between the 5th example and the 1st example.
[0055]And in the 5th example, the amplifier 5, the binarization circuit 6, the decode circuit 7, and the adder circuit 10 constitute the signal processing part.
[0056]The 5th example that has this composition operates as follows.
[0057]The simultaneous drive of the 1st the 2nd light projection part 2-1 thru/or 2-2 is carried out by control of introduction and the control driving circuit 9, and intermittent light is simultaneously generated to predetermined timing by it from the 1st the 3rd light projection part 2-1 thru/or 2-2. After being projected on such lights in the information storage side 1a which printed the bar code 1, it is reflected from the information storage side 1a which printed the bar code 1, respectively, and they enter into the light sensing portion 4 according to each as two catoptric light. At this time, the light sensing portion 4 generates two bar code read signals respectively corresponding to two catoptric light which entered, and supplies them to two inputs of the adder circuit 10. The adder circuit 10 carries out simple addition of these two bar code read signals, and generates one addition bar code read signal. After the following **** and an addition bar code read signal are changed into a binary-ized signal in the binarization circuit 6, they are decoded in the decode circuit 7 and outputted from a bar code reader as a status signal. An addition bar code read signal is supplied also to the regular-reflection detector circuit 8, and detects whether the regular-reflection state has occurred in the addition bar code read signal. The regular-reflection detector circuit 8 will supply a regular-reflection non detection signal to the control driving

circuit 9, if it detects that the regular-reflection state has not occurred in an addition bar code read signal, and if it, on the other hand, detects that the regular-reflection state has occurred in the addition bar code read signal, it will supply a regular-reflection detecting signal to the control driving circuit 9. if a regular-reflection non detection signal is supplied to the control driving circuit 9 -- till then -- if it is made to drive simultaneously the 1st the 2nd light projection part 2-1 thru/or 2-2 in a similar manner and a regular-reflection detecting signal is supplied on the other hand, it is made to stop a drive for the 1st the 2nd light projection part 2-1 thru/or one 2-every 2 in order In this case, while reading of a fixed period, for example, this bar code, is performed when stopping the drive of the 1st light projection part 2-1, and the regular-reflection state of an addition bar code read signal is solved, the drive of the 1st light projection part 2-1 is stopped. Even if it stops the drive of the 1st light projection part 2-1, when the regular-reflection state of an addition bar code read signal is not solved, the drive of the 1st light projection part 2-1 is made to resume, and the drive of the 2nd light projection part 2-2 is stopped instead. If the regular-reflection state of an addition bar code read signal is solved by the stop of a drive of this 2nd light projection part 2-2, While reading of a fixed period, for example, this bar code, is performed, he stops the drive of the 2nd light projection part 2-2, and is trying to make the regular-reflection state of an addition bar code read signal cancel between short time comparatively like a front.

[0058]Although the example using the 1st the 2nd light projection part 2-1 thru/or 2-2 as a light projection part was given and explained, the number of usable light projection parts is not restricted to two things, but it may be made to use the light projection part of the number beyond three or it in this example in the 5th example.

[0059]When the drive of one light projection part in two or more light projection parts is suspended, the driver voltage of the remaining light projection parts is raised slightly, and it may be made to control in the 5th example, so that the amplitude of an addition bar code read signal becomes approximately regulated said one stop front of a drive of a light projection part, and after a stop.

[0060]Thus, while using two or more light projection parts 2-1 thru/or all of 2-2 according to the 5th example, when a regular-reflection state occurs in one light projection part of them, the regular-reflection detector circuit 8, Until it detects generating of a regular-reflection state from an addition bar code read signal, the drive of this one light projection part is suspended and the regular-reflection state of an addition bar code read signal is canceled, Since it is made to carry out driving stoppage of two or more light projection parts 2-1 thru/or one 2-every 2 to turn, It needs to be comparatively canceled in a short time, and the generated regular-reflection state can process a bar code read signal in the normal state where a regular-reflection state does not always occur, and does not need to read a bar code by generating of a regular-reflection state repeatedly.

[0061]According to this 5th example, based on the simultaneous projection from two or more light projection parts 2-1 thru/or 2-2, Since signal processing, such as generating of a binary-ized signal and detection of a regular-reflection state, is performed using the addition bar code read signal with which the light sensing

portion 4 generated two or more bar code read signals, and added these bar code read signals, these signal processing can be performed by high sensitivity.
[0062]Then, drawing 9 is a lineblock diagram showing the 6th example of the optical reader concerning this invention, and, similarly shows the example of a bar code reader as an optical reader. Here, in drawing 9, the same numerals are attached about the same component as the component shown in drawing 1.
[0063]The difference of composition between the 6th example and the 1st example, The 6th example connects the 1st and 2nd sample hold circuits 12 and 13 to the output side of the amplifier 5, The 1st and 2nd binarization circuits 14 and 15 are connected to each output side of these 1st and 2nd sample hold circuits 12 and 13, respectively, and the selection circuitry 16 which chooses a decoded signal is formed between the output of the 1st and 2nd binarization circuits 14 and 15, and a decode circuit -- ****, [receive and] As opposed to the point that the 1st example has established the binarization circuit 6 in the output side of the amplifier 5, and the 6th example having connected the input of the regular-reflection detector circuit 8 to two outputs (each input of the 1st sample hold circuit 12 and the 2nd sample hold circuit 13) of the amplifier 5, The point and the 6th example which the 1st example has connected to one output of the amplifier 5 always carry out the simultaneous drive of the 1st and 2nd light projection parts 2-1 thru/or 2-2 by the control driving circuit 9, And to driving so that intermittent light may be generated to the timing from which the 1st light projection part 2-1 and 2nd light projection part 2-2 differ, the 1st example is only the point of driving any one light projection part, in addition there is no constitutional difference between the 6th example and the 1st example.
[0064]Here, in the 6th example, the amplifier 5, the decode circuit 7, the 1st and 2nd sample hold circuits 12 and 13, the 1st and 2nd binarization circuits 14 and 15, and the selection circuitry 16 constitute the signal processing part.
[0065]Drawing 10 is a signal waveform diagram showing a part of signal state of each part at the time of bar code reading in the bar code reader of the 6th example, An example of the bar code pattern in which (a) is read, the output wave of the intermittent light in which the 1st light projection part 2-1 generates (b), The output wave of the intermittent light which the 2nd light projection part 2-2 generates, and (d) (c) The output signal waveform of the amplifier 5, As for the output wave of the 1st sample hold circuit 12, and (f), the binary-ized signal wave form of the 1st binarization circuit 14 and (h of the output wave of the 2nd sample hold circuit 13 and (g)) are [(e)] the binary-ized signal wave forms of the 2nd binarization circuit 15. In this case, in drawing 10, signs that the regular-reflection state occurred in the 2nd light projection part 2-2 side within the period (period from the time t1 to t2) shown by two dotted lines are shown.
[0066]Operation of Bako Dolly Dadu of the 6th example is explained using drawing 10.
[0067]First, by control of the control driving circuit 9 the 1st and 2nd light projection parts 2-1 and 2-2, As a simultaneous drive is carried out and it is shown in drawing 10 (b) and (c), intermittent light is generated to different predetermined timing from the 1st and 2nd light projection parts 2-1 and 2-2, and it is projected in the information storage side 1a which printed the bar code 1,

respectively. In the information storage side 1a which printed the bar code 1, it is reflected, respectively, and these incident light enters into the light sensing portion 4. A bar code read signal is generated corresponding to the catoptric light which entered, this bar code read signal is supplied to the amplifier 5, and the light sensing portion 4 is amplified even to a necessary level. In this case, a bar code read signal is a thing of the form where the catoptric light of the 1st and 2nd light projection parts 2-1 and the intermittent light generated from 2-2 was put together by turns in time, as shown in drawing 10 (d). The amplified bar code read signal is supplied to the 1st and 2nd sample hold circuits 12 and 13, Sample hold is carried out corresponding to the generating timing of the 1st and 2nd light projection parts 2-1 and the intermittent light from 2-2, and it is changed into the 1st and 2nd sample holding signals as shown in drawing 10 (e) and (f). Subsequently, the 1st and 2nd sample holding signals are supplied to the 1st and 2nd binarization circuits 14 and 15 according to each, and as shown in drawing 10 (g) and (h), they are changed into the 1st and 2nd binary-ized signals, respectively. Then, the 1st and 2nd binary-ized signals are supplied to the selection circuitry 16, and one binary-ized signal in the 1st and 2nd binary-ized signals is chosen. And this selected binary-ized signal is supplied to the decode circuit 7, is decoded, and is outputted from a bar code reader as a status signal.

[0068]In this case, the bar code read signal acquired by the output side of the 1st and 2nd sample hold circuits 12 and 13 is supplied also to the regular-reflection detector circuit 8, and detection of whether the regular-reflection state has occurred in the regular-reflection detector circuit 8 is performed. The regular-reflection detector circuit 8 like [before the time t1 of a graphic display and after time t2] to drawing 10, When it detects that the regular-reflection state has not occurred in a bar code read signal, supply a regular-reflection non detection signal to the control driving circuit 9 and the selection circuitry 16, and on the other hand, like [between the time t1 of a graphic display, and the time t2] to drawing 10, Detection of that the regular-reflection state has occurred in the bar code read signal will supply a regular-reflection detecting signal to the control driving circuit 9 and the selection circuitry 16.

[0069]When a regular-reflection non detection signal is supplied, make it the control driving circuit 9 drive simultaneously the 1st and 2nd light projection parts 2-1 and 2-2 in a similar manner even with it, and on the other hand, if a regular-reflection detecting signal is supplied, It is judged whether the regular-reflection state occurred from timing when the regular-reflection state occurred in which [the 1st and 2nd light projection parts 2-1 and / of 2-2] side, In the light projection part of the side which the regular-reflection state has generated, and the example of the graphic display to drawing 10, while the drive of the 2nd light projection part 2-2 is stopped promptly and reading of a fixed period, for example, this bar code, is performed, the drive of the 2nd light projection part 2-2 is stopped, and generating of a regular-reflection state is canceled. The selection circuitry 16 will continue supplying one binary-ized signal in the 1st and 2nd binary-ized signals to the decode circuit 7 similarly even with it, if a regular-reflection non detection signal is supplied. On the other hand, if a regular-reflection detecting signal is supplied, in the stop of selection of the binary-ized signal acquired by the

intermittent light from the light projection part of the side which the regular-reflection state has generated, and the example of the graphic display to drawing 10, selection of the 2nd binary-ized signal obtained by the intermittent light from the 2nd light projection part 2-2 will be stopped. Namely, the selection circuitry 16 continues selection of the 1st binary-ized signal, when the 1st binary-ized signal is chosen till then, The 1st binary-ized signal is supplied to the decode circuit 7, on the other hand, when the 2nd binary-ized signal is chosen till then, selection of the 2nd binary-ized signal is suspended, the 1st binary-ized signal is newly chosen, and the 1st binary-ized signal is supplied to the decode circuit 7.
[0070]Although the example using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part was given and explained in the 6th example, The number of usable light projection parts is not restricted to two things, but it may be made to use a number beyond three or it of light projection parts which generate intermittent light to timing different, respectively in this example.
[0071]In the 6th example, when the drive of one light projection part in two or more light projection parts is suspended, control which raises the driver voltage of the remaining light projection parts slightly may be performed.
[0072]Thus, when according to the 6th example two or more light projection parts 2-1 which generate intermittent light to timing different, respectively, and 2-2 are used and a regular-reflection state occurs in one light projection part of them, Detect the regular-reflection detector circuit 8 from a bar code read signal, and generating of a regular-reflection state the control driving circuit 9, While stopping promptly the drive of the light projection part which serves as a generation cause of a regular-reflection state from the generating timing of a regular-reflection state, Since he is trying to decode the binary-ized signal which has not been influenced by the regular-reflection state, Detection of a generated regular-reflection state needs to be extremely performed in a short time, a bar code read signal can be processed in the normal state where a regular-reflection state does not always occur, and it is not necessary to read a bar code by generating of a regular-reflection state repeatedly.
[0073]Continuing drawing 11 is a lineblock diagram showing the 7th example of the optical reader concerning this invention, and, similarly shows the example of a bar code reader as an optical reader. In drawing 11, the same numerals are attached about the same component as the component shown in drawing 9.
[0074]The difference of composition between the 7th example and the 6th example, As opposed to the 7th example having connected the decode circuit 7 to the output side of the 1st and 2nd binarization circuits 14 and 15 directly, The point that the 6th example has connected the decode circuit 7 to the output side of the 1st and 2nd binarization circuits 14 and 15 via the selection circuitry 16, As opposed to the 7th example giving the function to judge whether decoding was correctly attained in the decode circuit 7 at the time of decoding of a binary-ized signal, It is only the point of giving the function for which the 6th example only decodes a binary-ized signal to the decode circuit 7, in addition there is no constitutional difference between the 7th example and the 6th example.
[0075]In this case, in the 7th example, the amplifier 5, the decode circuit 7, the 1st and 2nd sample hold circuits 12 and 13, and the 1st and 2nd binarization

circuits 14 and 15 constitute the signal processing part.
[0076]About the difference on operation of the 7th example and the 6th example, the 6th example, One binary-ized signal in the 1st [which was obtained in the 1st and 2nd binarization circuits 14 and 15] and 2nd binary-ized signals is chosen in the selection circuitry 16, To decoding this selected binary-ized signal in the decode circuit 7, and making it output as a status signal, the 7th example, While decoding individually the 1st and 2nd binary-ized signals acquired in the 1st and 2nd binarization circuits 14 and 15 in the decode circuit 7, operation and ****** of the 6th example that the decode circuit 7 chooses one signal correctly decoded out of these binary-ized signals, and it only differs in that it is made to output as a status signal, and already described other operations -- it is the same. For this reason, about the operation in the 7th example, explanation is omitted except for the point of operation of the decode circuit 7 described below.
[0077]By the way, when operation of the decode circuit 7 of the 7th example is described in more detail, the decode circuit 7, When decoding the 1st and 2nd binary-ized signal inputted one by one, respectively, If it detects that an internal memory was not able to be made to have been once able to store the decoded binary-ized signal, and one binary-ized signal, for example, the 2nd binary-ized signal, was not able to perform exact decoding by generating of a regular-reflection state, or [making it make this output as a status signal by reading the 1st decoded binary-ized signal that has been stored to the internal memory] -- or, It is high-speed respectively and the 1st and 2nd binary-ized signal inputted one by one is decoded, If it detects that one binary-ized signal in the these-decoded binary-ized signal, for example, the 2nd binary-ized signal, was not able to perform exact decoding by generating of a regular-reflection state, He extracts the 1st binary-ized signal with which exact decoding was performed, and is trying to make this output as a status signal.
[0078]In the 7th example, corresponding to this, using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part as a sample hold circuit and a binarization circuit, Although the example using the 1st and 2nd sample hold circuits 12 and 13 and 1st and 2nd binarization circuits 14 and 15 was given and explained, respectively, In this example, the number of the number of usable light projection parts, a sample hold circuit, and binarization circuits, It is not restricted to two things but may be made to use the sample hold circuit and binarization circuit of a number beyond three or it similarly to timing different, respectively corresponding to a number beyond three or it of light projection parts which generate intermittent light, and it, respectively.
[0079]Thus, according to the 7th example, two or more binary-ized signals acquired corresponding to arrangement of two or more light projection parts are decoded one by one in the decode circuit 7, Since the binary-ized signal which was able to perform exact decoding is made into a status signal and it is made to carry out a selected output out of the these-decoded binary-ized signal, Even if the regular-reflection state occurred in either of two or more light projection parts, the selected output of one of the binary-ized signals which was always able to perform exact decoding comes to be carried out as a status signal, and it does not need to read a bar code by generating of a regular-reflection state

repeatedly.
[0080]Subsequently, drawing 12 is a lineblock diagram showing the 8th example of the optical reader concerning this invention, and, similarly shows the example of a bar code reader as an optical reader. Here, in drawing 12, the same numerals are attached about the same component as the component shown in drawing 9.
[0081]The difference of composition between the 8th example and the 6th example, As opposed to the 8th example having connected the selection circuitry 16 to the output side of the 1st and 2nd binarization circuits 14 and 15 directly, The point that the 6th example has connected the selection circuitry 16 to the output side of the 1st and 2nd sample hold circuits 12 and 13 via the binarization circuits 14 and 15, respectively, As opposed to the 8th example having connected the output of the regular-reflection detector circuit 8 only to the control end of the selection circuitry 16, The 6th example is only the point of having connected the output of the regular-reflection detector circuit 8 to the input of the control driving circuit 9, and the control end of the selection circuitry 16, respectively, in addition there is no constitutional difference between the 8th example and the 6th example.
[0082]In this case, in the 8th example, the amplifier 5, the binarization circuit 6, the decode circuit 7, and the 1st and 2nd sample hold circuits 12 and 13 constitute the signal processing part.
[0083]The 8th example that has this composition performs the following operations.
[0084]By control of the control driving circuit 9, a simultaneous drive is carried out, intermittent light is generated to different predetermined timing from the 1st and 2nd light projection parts 2-1 and 2-2, and it is projected on the 1st and 2nd light projection parts 2-1 and 2-2 in the information storage side 1a which printed the bar code 1, respectively. It is reflected in respect of [1a] the information storage which printed the bar code 1, and these incident light enters into the light sensing portion 4. A bar code read signal is generated corresponding to the catoptric light which entered, this bar code read signal is supplied to the amplifier 5, and the light sensing portion 4 is amplified even to a necessary level. The amplified bar code read signal is supplied to the 1st and 2nd sample hold circuits 12 and 13, and sample hold is carried out corresponding to the generating timing of the 1st and 2nd light projection parts 2-1 and the intermittent light from 2-2, and it is changed into the 1st and 2nd sample holding signals. Subsequently, after the selection circuitry 16 is supplied and one signal in them is chosen, the 1st and 2nd sample holding signals are supplied to the binarization circuit 6, and are changed into a binary-ized signal. Then, this binary-ized signal is supplied to the decode circuit 7, is decoded, and is outputted from a bar code reader as a status signal.
[0085]In this case, the 1st and 2nd sample holding signals acquired by the output side of the 1st and 2nd sample hold circuits 12 and 13 are supplied to the regular-reflection detector circuit 8, and detection of whether the regular-reflection state has occurred in the regular-reflection detector circuit 8 is performed. The regular-reflection detector circuit 8 will supply a regular-reflection

non detection signal to the selection circuitry 16, if it detects that the regular-reflection state has not occurred in the 1st and 2nd sample holding signals, and if it, on the other hand, detects that the regular-reflection state has occurred to the 1st and 2nd signals, it will supply a regular-reflection detecting signal to the selection circuitry 16. The selection circuitry 16 will continue supplying one signal in the 1st and 2nd sample holding signals to the binarization circuit 6 similarly even with it, if a regular-reflection non detection signal is supplied. On the other hand, if a regular-reflection detecting signal is supplied to one signal in the 1st and 2nd sample holding signals, for example, the 2nd sample holding signal, When the 1st sample holding signal is chosen till then, selection of the 1st sample holding signal is continued, When the 1st sample holding signal is supplied to the binarization circuit 6 and the 2nd sample holding signal is chosen till then, selection of the 2nd sample holding signal is suspended, the 1st sample holding signal is newly chosen, and the binarization circuit 6 of the following ** is supplied.

[0086]Although the example using the 1st and 2nd sample hold circuits 12 and 13 was given and explained in the 5th example corresponding to it, using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part, In this example, the number of the sample hold circuits corresponding to the number of usable light projection parts and it is not restricted to two things, It may be made to use the sample hold circuit of the number beyond a number beyond three or it of light projection parts which generate intermittent light to timing different, respectively and three, or it.

[0087]Thus, when according to the 5th example two or more light projection parts 2-1 which generate intermittent light to timing different, respectively, and 2-2 are used and a regular-reflection state occurs in one light projection part of them, Since the regular-reflection detector circuit 8 is made to perform decoding which follows binary-izing and it in the sample holding signal which detects generating of a regular-reflection state from the 1st and 2nd sample holding signals, and has not been influenced by the regular-reflection state, A necessary status signal can be made to draw without always being influenced by the generated regular-reflection state. According to the 5th example, again, if generating of a regular-reflection state is detected in the middle of reading of a bar code, although it is necessary to read a bar code, it is only sufficient to also perform rereading picking of this bar code once, and it is not necessary to read a bar code repeatedly.

[0088]Although the case where an optical reader was a bar code reader was mentioned as the example and explained in each above example, If the optical reader by this invention is not restricted when it is a bar code reader, and a line recording medium is read like a bar code, it is needless to say that it is applicable to other similar devices.

[0089]

[Effect of the Invention]In [as explained above] the invention according to claim 1 to 9, The regular-reflection primary detecting element 8 supplies the regular-reflection detecting signal acquired at the time of detection of generating of a regular-reflection state to the control actuator 9, and the control actuator 9 carries

out the control drive of two or more light projection parts 2-1 and 2-2 in a different drive mode at the time of supply of a regular-reflection detecting signal, and un-supplying, and is removing generating of a regular-reflection state. And only two or more light projection parts 2-1 and one light projection part in 2-2 are made to specifically drive at the time of un-supplying of a regular-reflection detecting signal, . Make other one different light projection part from this one light projection part drive at the time of supply of a regular-reflection detecting signal, and are removing generating of a regular-reflection state. Or until it makes two or more light projection parts 2-1 and all of 2-2 drive and detection of generating of a regular-reflection state is lost at the time of supply of a regular-reflection detecting signal at the time of un-supplying of a regular-reflection detecting signal, driving stoppage of two or more light projection parts 2-1 and one 2-every 2 being carried out to turn, and generating of a regular-reflection state, [remove or] At the time of un-supplying of a regular-reflection detecting signal, the intermittent drive of two or more light projection parts 2-1 and 2-2 is carried out to timing different, respectively, driving stoppage of the light projection part which serves as a generation cause in the regular-reflection state is promptly carried out at the time of supply of a regular-reflection detecting signal, and generating of a regular-reflection state is excluded.

[0090]Thus, since according to the invention according to claim 1 to 9 the control actuator 9 will drive suitably two or more light projection parts 2-1 and 2-2 so that generating of this regular-reflection state may be removed if generating of a regular-reflection state is detected in the regular-reflection primary detecting element 8, Irrespective of the existence of generating of a regular-reflection state, it is effective in it not becoming impossible to read a line recording medium and to generate a status signal, and becoming possible to perform exact reading of a line recording medium promptly.

[0091]In this case, even if according to the invention according to claim 3 it uses where a bar code reader is leaned more than needed, and it cannot perform reading of a bar code with the 1st scan, It is effective in generating a normal bar code read signal from a bar code reader with the 2nd scan, and being able to generate a decode output from the decode circuit 7, and according to the invention according to claim 4 to 5. Even if a bar code reader uses in the state where it leaned more than needed, at the time of the 1st scan, It is effective in generating a normal bar code read signal from a bar code reader, and being able to generate a decode output from the decode circuit 7, and according to the invention according to claim 6. The normal and optimal bar code read signal is generated from a bar code reader, a binary-ized signal can be decoded in the optimal state in the decode circuit 7, and it is effective in the ability to raise the occurrence frequency of the decode output from the decode circuit 7.

[0092]In the invention according to claim 10 to 12, To timing different, respectively, two or more light projection parts 2-1 and 2-2 project intermittent light, and the signal processing part 5 thru/or 7, 11 to 16, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for two or more light projection parts of every individually, and the extraction output of the status signal of the

good state in the recording-medium read signal by which the conversion process was carried out in the conversion process course of these plurality is carried out selectively. And when two or more recording-medium read signals are specifically decoded, The extraction output of the one status signal in the recording-medium read signal which detects generating of a regular-reflection state of two or more recording-media read signals and with which the extraction output of the one status signal in the recording-medium read signal with which decoding was performed regularly is carried out selectively, or generating of a regular-reflection state is not detected is carried out selectively.
[0093]Thus, since the extraction output of the status signal of the good state in two or more recording-medium read signals is carried out selectively according to the invention according to claim 10 to 12, In spite of the existence of generating of a regular-reflection state, it is effective in it not becoming impossible to read a line recording medium and to generate a status signal, and becoming possible to perform exact reading of a line recording medium promptly.

EFFECT OF THE INVENTION

[Effect of the Invention]In [as explained above] the invention according to claim 1 to 9, The regular-reflection primary detecting element 8 supplies the regular-reflection detecting signal acquired at the time of detection of generating of a regular-reflection state to the control actuator 9, and the control actuator 9 carries out the control drive of two or more light projection parts 2-1 and 2-2 in a different drive mode at the time of supply of a regular-reflection detecting signal, and un-supplying, and is removing generating of a regular-reflection state. And only two or more light projection parts 2-1 and one light projection part in 2-2 are made to specifically drive at the time of un-supplying of a regular-reflection detecting signal, . Make other one different light projection part from this one light projection part drive at the time of supply of a regular-reflection detecting signal, and are removing generating of a regular-reflection state. Or until it makes two or more light projection parts 2-1 and all of 2-2 drive and detection of generating of a regular-reflection state is lost at the time of supply of a regular-reflection detecting signal at the time of un-supplying of a regular-reflection detecting signal, driving stoppage of two or more light projection parts 2-1 and one 2-every 2 being carried out to turn, and generating of a regular-reflection state, [remove or] At the time of un-supplying of a regular-reflection detecting signal, the intermittent drive of two or more light projection parts 2-1 and 2-2 is carried out to timing different, respectively, driving stoppage of the light projection part which serves as a generation cause in the regular-reflection state is promptly carried out at the time of supply of a regular-reflection detecting signal, and generating of a regular-reflection state is excluded.
[0090]Thus, since according to the invention according to claim 1 to 9 the control actuator 9 will drive suitably two or more light projection parts 2-1 and 2-2 so that generating of this regular-reflection state may be removed if generating of a regular-reflection state is detected in the regular-reflection primary detecting element 8, Irrespective of the existence of generating of a regular-reflection state, it is effective in it not becoming impossible to read a line recording medium and

to generate a status signal, and becoming possible to perform exact reading of a line recording medium promptly.
[0091]In this case, even if according to the invention according to claim 3 it uses where a bar code reader is leaned more than needed, and it cannot perform reading of a bar code with the 1st scan, It is effective in generating a normal bar code read signal from a bar code reader with the 2nd scan, and being able to generate a decode output from the decode circuit 7, and according to the invention according to claim 4 to 5. Even if a bar code reader uses in the state where it leaned more than needed, at the time of the 1st scan, It is effective in generating a normal bar code read signal from a bar code reader, and being able to generate a decode output from the decode circuit 7, and according to the invention according to claim 6. The normal and optimal bar code read signal is generated from a bar code reader, a binary-ized signal can be decoded in the optimal state in the decode circuit 7, and it is effective in the ability to raise the occurrence frequency of the decode output from the decode circuit 7.
[0092]In the invention according to claim 10 to 12, To timing different, respectively, two or more light projection parts 2-1 and 2-2 project intermittent light, and the signal processing part 5 thru/or 7, 11 to 16, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for two or more light projection parts of every individually, and the extraction output of the status signal of the good state in the recording-medium read signal by which the conversion process was carried out in the conversion process course of these plurality is carried out selectively. And when two or more recording-medium read signals are specifically decoded, The extraction output of the one status signal in the recording-medium read signal which detects generating of a regular-reflection state of two or more recording-media read signals and with which the extraction output of the one status signal in the recording-medium read signal with which decoding was performed regularly is carried out selectively, or generating of a regular-reflection state is not detected is carried out selectively.
[0093]Thus, since the extraction output of the status signal of the good state in two or more recording-medium read signals is carried out selectively according to the invention according to claim 10 to 12, In spite of the existence of generating of a regular-reflection state, it is effective in it not becoming impossible to read a line recording medium and to generate a status signal, and becoming possible to perform exact reading of a line recording medium promptly.

MEANS

[Means for Solving the Problem]Two or more light projection parts in which this invention floodlights intermittent light or continuation light to predetermined timing from a direction which is different in an information storage side which has a line recording medium in order to attain said purpose, In an optical reader provided with a light sensing portion which receives catoptric light from said information storage side, and generates a recording-medium read signal, a signal processing part which does the process conversion of said recording-medium read signal to a status signal, and a control actuator which drives said two or more light

projection parts, Detect generating of a regular-reflection state from said recording-medium read signal, have a regular-reflection primary detecting element which supplies a regular-reflection detecting signal acquired at the time of this detection to said control actuator, and said control actuator, When said regular-reflection detecting signal is supplied, the control drive of said two or more light projection parts is carried out in a different drive mode from a time of said regular-reflection detecting signal not being supplied, and it has the 1st means that removed generating of said regular-reflection state.
[0012]In order to attain said purpose, this invention, Two or more light projection parts which floodlight intermittent light to predetermined timing from a direction which is different in an information storage side which has a line recording medium, In an optical reader provided with a light sensing portion which receives catoptric light from said information storage side, and generates a recording-medium read signal, a signal processing part which changes said recording-medium read signal into a status signal, and a control actuator which drives said two or more light projection parts, The control drive of said two or more light projection parts is carried out, and so that intermittent light may be floodlighted to timing different, respectively said signal processing part, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for said two or more light projection parts of every individually, and has 2nd means to carry out the extraction output of the status signal of a good state in said recording-medium read signal by which the conversion process was carried out in a conversion process course of these plurality selectively.

OPERATION

[Function]In said 1st means, a regular-reflection primary detecting element detects generating of a regular-reflection state from a recording-medium read signal, The regular-reflection detecting signal acquired at the time of detection of this regular-reflection state is supplied to a control actuator, and when a regular-reflection detecting signal is supplied, a control actuator carries out the control drive of two or more light projection parts in a different drive mode from the time of a regular-reflection detecting signal not being supplied, and he is trying to remove generating of a regular-reflection state. When a regular-reflection detecting signal is not supplied, only one light projection part in two or more light projection parts is made to drive and a regular-reflection detecting signal is specifically supplied, . Make other one different light projection part from this one light projection part drive, and are trying to remove generating of a regular-reflection state. Or when all of two or more light projection parts are made to drive when a regular-reflection detecting signal is not supplied, and a regular-reflection detecting signal is supplied, until detection of generating of a regular-reflection state is lost, carrying out driving stoppage of two or more one light projection parts of every to turn, and he trying to remove generating of a regular-reflection state, or, When the intermittent drive of two or more light projection parts is carried out to timing different, respectively when a regular-reflection detecting signal is not supplied, and a regular-reflection detecting signal is

supplied, he carries out driving stoppage of the light projection part which is generating the regular-reflection state promptly, and is trying to remove generating of a regular-reflection state.
[0014]Thus, since he is trying for a control actuator to make two or more light projection parts drive suitably so that generating of this regular-reflection state may be removed if generating of a regular-reflection state is detected in a regular-reflection primary detecting element according to said 1st means, Irrespective of the existence of generating of a regular-reflection state, it does not become impossible to read a line recording medium and to generate a status signal, and the optical reader which can perform exact reading of a line recording medium promptly is obtained.
[0015]In said 2nd means, two or more light projection parts, Are made to carry out a control drive and so that intermittent light may be floodlighted to timing different, respectively a signal processing part, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for two or more light projection parts of every individually, and is made to carry out the extraction output of the status signal of the good state in the recording-medium read signal by which the conversion process was carried out in the conversion process course of these plurality selectively. . When two or more recording-medium read signals are decoded, it is specifically made to carry out the extraction output of the one status signal in the recording-medium read signal with which decoding was performed regularly selectively. Or it is made to carry out the extraction output of the one status signal in the recording-medium read signal which detects generating of a regular-reflection state of two or more recording-media read signals and with which generating of a regular-reflection state is not detected selectively.
[0016]Thus, since it is made to carry out the extraction output of the status signal of the good state in two or more recording-medium read signals selectively according to said 2nd means, In spite of the existence of generating of a regular-reflection state, it does not become impossible to read a line recording medium and to generate a status signal, and the optical reader which can perform exact reading of a line recording medium promptly is obtained.

EXAMPLE
[Example]Hereafter, the example of this invention is described in detail using a drawing.
[0018]Drawing 1 is a lineblock diagram showing the 1st example of the optical reader concerning this invention, and shows the example of a bar code reader as an optical reader. Drawing 2 is a section lineblock diagram showing an example of the condition of use in the bar code reader concerning this invention.
[0019]As shown in drawing 1 and drawing 2, the bar code 1 is printed on the information storage side 1a like the known bar code. The 1st and 2nd light projection parts 2-1 that consist of a luminous-radiation diode (LED) etc., and 2-2, It is arranged at the position comparatively near the reading section (tip part) of a bar code reader, and intervention arrangement of the photoconductivity ways

3-1, such as a glass fiber, and 3-2 is carried out, respectively between the 1st and 2nd light projection parts 2-1, and 2-2 and a reading section (tip part). The light sensing portion 4 which consists of photodiode arrays etc. is arranged so that it may rank with the 1st and 2nd light projection parts 2-1 and 2-2.
It is projected on the 1st and 2nd light projection parts 2-1 and the light obtained from 2-2 outside via the photoconductivity way 3-1 and 3-2, and it is reflected in respect of [1a] the information storage which printed the bar code 1.
This catoptric light enters into the light sensing portion 4 via the pinhole plate 4b, after being condensed with the lens 4a. The output of the light sensing portion 4 is connected to the input of the amplifier 5, and the output of the amplifier 5 is connected to the input of the binarization circuit 6. The output of the binarization circuit 6 is connected to the input of the decode circuit 7, and the output of the decode circuit 7 is connected to the output terminal 8 of a bar code reader. On the other hand, the output of the amplifier 5 is connected to the input of the regular-reflection detector circuit 8, and the output of the regular-reflection detector circuit 8 is connected to the input of the control driving circuit 9. The output of the control driving circuit 9 is connected to the 1st and 2nd light projection parts 2-1 and 2-2, respectively. In this case, the amplifier 5, the binarization circuit 6, and the decode circuit 7 constitute the signal processing part.
[0020]Continuing drawing 3 is a signal waveform diagram showing the signal state of each part at the time of bar code reading in the bar code reader of the 1st example, The bar code read signal waveform by which it was amplified when a regular-reflection state generated the bar code read signal waveform by which it was amplified in case an example of the bar code pattern in which (a) is read, and (b) did not have a regular-reflection state in generating, and (c), and (d) are binary-ized signal wave forms.
[0021]Here, drawing 3 is used together and operation of Bako Dolly Dadu of the 1st example is explained.
[0022]First, the 1st and 2nd light projection parts 2-1 and 2-2 always have only one light projection part in an operating state by the drive of the control driving circuit 9, and when only the 1st light projection part 2-1 is in an operating state, as for the 1st light projection part 2-1, intermittent light or continuation light is generated to predetermined timing, for example. The light which the 1st light projection part 2-1 generated is led to the reading section (tip part) of a bar code reader via the photoconductivity way 3-1. At this time, a user has a bar code reader in a hand, and it is the bar code 1 (this bar code 1) about the reading section (tip part) of a bar code reader. for example, the thing which has a pattern as shown in drawing 3 (a) -- it is -- if the printed information storage side 1a is made to counter, the light led to the reading section (tip part) from the 1st light projection part 2-1, It is reflected in the information storage side 1a which was projected in the information storage side 1a which printed the bar code 1, then printed the bar code 1. This catoptric light is supplied to the light sensing portion 4 through the pinhole of the pinhole plate 4b, after being condensed with the lens 4a. Since the pinhole plate 4b scans a pinhole to the light sensing portion 4 at the time of this operation, equivalent catoptric light comes to enter into the light

sensing portion 4 with having scanned the information storage side 1a which printed the bar code 1 along with bar code 1 formation part. If catoptric light is received, the light sensing portion 4 will generate a bar code read signal with the amplitude according to the light volume of catoptric light, and will supply this bar code read signal to the signal processing part which consists of the amplifier 5 of the following **, the binarization circuit 6, and the decode circuit 7. In a signal processing part, a bar code read signal is first amplified by even the predetermined level in the amplifier 5, and a wave-like bar code read signal as shown in drawing 3 (b) is acquired. Next, this bar code read signal is binary-ized in the binarization circuit 6, and is changed into a wave-like binary-ized signal as shown in drawing 3 (d). Then, this binary-ized signal is decoded in the decode circuit 7, and this decoded signal is outputted from a bar code reader as a status signal.

[0023]The bar code read signal acquired by the output side of the amplifier 5 is supplied to the regular-reflection detector circuit 8, and is detecting whether this bar code read signal shows generating of a regular-reflection state. And the regular-reflection detector circuit 8 supplies a regular-reflection non detection signal to the control driving circuit 9, while the detection is performed if it detects that there is no generating of a regular-reflection state as the inputted bar code read signal is shown in drawing 3 (b), for example. The control driving circuit 9 continues the drive of the 1st light projection part 2-1 by supply of this regular-reflection non detection signal the light projection part of the side currently driven till then, and here, and the 1st light projection part 2-1 continues generating of the intermittent light of predetermined timing. On the other hand, the regular-reflection detector circuit 8 is the first portion, as the inputted bar code read signal is shown in drawing 3 (c), for example, Shortly after detecting that it detects having changed reference level sharply to the negative direction, namely, there was generating of a regular-reflection state about it, a regular-reflection detecting signal is supplied to the control driving circuit 9. If this regular-reflection detection is received, in order that it may remove the generation cause of a regular-reflection state, the control driving circuit 9 stops the drive of the 1st light projection part 2-1, simultaneously, makes the drive of the 2nd light projection part 2-2 start, and changes a light projection part [the light projection part and here] where it was driving till then. Generating of the intermittent light of the 1st light projection part 2-1 or continuation light is suspended by the change of this light projection part, Instead, as the regular-reflection state which the 2nd light projection part 2-2 came to generate a predetermined intermittent light or continuation light of timing, and generated in the bar code read signal is shown in drawing 3 (c), it is eliminated promptly, and the bar code read signal with which reference level is not changed is acquired. And this bar code read signal is binary-ized in the binarization circuit 6, after being changed into a binary-ized signal as shown in drawing 3 (d), is decoded in the decode circuit 7 and outputted from a bar code reader as a status signal.

[0024]Continuing drawing 4 is the flow chart which showed each operation of detection of generating of a regular-reflection state, and a change of a light projection part collectively in the bar code reader of the 1st example.

[0025]Main operations of the bar code reader of the 1st example are again explained using this flow chart.
[0026]First, in Step S1, by control of the control driving circuit 9, one light projection part 2-1, for example, the 1st light projection part, drives, and the intermittent light of predetermined timing is generated from the 1st light projection part 2-1. This light is supplied to the light sensing portion 4, after being reflected in the information storage side 1a which printed the bar code 1.
[0027]Next, in Step S2, the scan to the light sensing portion 4 begins, and the light sensing portion 4, The light which scanned the information storage side 1a which printed the bar code 1 enters, a bar code read signal with the amplitude corresponding to the light volume of this incident light is generated, and this bar code read signal is supplied to a signal processing part.
[0028]In continuing Step S3, the regular-reflection detector circuit 8 judges whether the amplified bar code read signal is over regular-reflection detection levels. As a result, when a bar code read signal judges it as (N) which has not exceeded regular-reflection detection levels, A regular-reflection non detection signal is outputted, it shifts to the following step S4, when it is judged as (Y) in which the bar code read signal is over regular-reflection detection levels on the other hand, a regular-reflection detecting signal is outputted, and it shifts to other step S5.
[0029]Subsequently, in step S4, the control driving circuit 9 will continue the drive of the 1st light projection part 2-1, if a regular-reflection non detection signal is received.
[0030]In Step S5, if a regular-reflection detecting signal is received, the control driving circuit 9 will stop the drive of the 1st light projection part 2-1, and will start the drive of the 2nd light projection part 2-2 instead.
[0031]The continuing scan of on Step S6 and as opposed to the light sensing portion 4 is stopped.
[0032]Finally, in Step S7, the decode circuit 7 decodes a binary-ized signal and generates a status signal.
[0033]Thus, when a regular-reflection state occurs in one light projection part 2-1 in use, for example, the 1st light projection part, according to the 1st example, Since he is trying to change so that the regular-reflection detector circuit 8 may detect generating of this regular-reflection state and may use the light projection part 2-2 of another side, for example, the 2nd light projection part, It needs to be canceled promptly, and the regular-reflection state can process a bar code read signal in the normal state where there is always no generating of a regular-reflection state, and does not need to read a bar code by generating of a regular-reflection state repeatedly.
[0034]Although the example using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part was given and explained, the number of usable light projection parts is not restricted to two things, but it may be made to use the light projection part of the number beyond three or it in this example in said 1st example.
[0035]In this case, in using three light projection parts, for example, the 1st, 2nd, and 3rd light projection part, it is always using one light projection part, for

example, the 1st light projection part.
It is also completely the same as if generating is detected, when a regular-reflection state will replace with use of the 1st light projection part, it will change so that the 2nd light projection part or 3rd light projection part may be used and will use four light projection parts or the light projection part of the number beyond it at the time of use of this 1st light projection part.

[0036]By the way, like the bar code reader used for the 1st example, When using it as a light projection part, changing only the 1st and 2nd light projection parts 2-1 and the light projection part of either of 2-2, Supposing the light projection part of the side which is used at the time of reading of a bar code where a bar code reader is leaned more than needed, and is then used is located in the bottom direction by chance, When the incident light from a light projection part in use is reflected in a bar code, the catoptric light stops entering into a bar code reader. For this reason, in the 1st example, rarely, a normal bar code read signal may be generated and the unexpected situation where decoding of a binary-ized signal cannot be performed in the decode circuit 7 may be produced from a bar code reader.
[0037]Drawing 5 is a lineblock diagram showing the 2nd example of the optical reader concerning this invention which formed the means which prevents generating of this unexpected situation, and shows the example of a bar code reader as an optical reader.
In drawing 5, the same numerals are attached about the same component as the component shown in drawing 1.

[0038]The difference of composition between the 2nd example and the 1st example, As opposed to the 2nd example having established the unsettled signal generating circuit 8-1 for OR circuit 8-2 in the output side of the decode circuit 7, respectively between the output side of the regular-reflection detector circuit 8, and the input side of the control driving circuit 9, The 1st example is only the point of providing neither the unsettled signal generating circuit 8-1 nor OR circuit 8-2, in addition there is no constitutional difference between the 2nd example and the 1st example.
[0039]In the unsettled signal generating circuit 8-1 of the 2nd example, an input is connected to the output of the decode circuit 7, an output is connected to one input of OR circuit 8-2, respectively, the input of another side is connected to the output of the regular-reflection detector circuit 8, and, as for OR circuit 8-2, the output is connected to the input of the control driving circuit 9, respectively.
[0040]In the 2nd example, the unsettled signal generating circuit 8-1, Since the bar code reader is used in the state where it leaned more than needed, at the time of reading of a bar code when decoding of a binary-ized signal cannot be performed in the decode circuit 7 namely, When a normal bar code read signal cannot be acquired with a bar code reader, an unsettled signal is generated, and an unsettled signal is supplied to the control driving circuit 9. And since the control driving circuit 9 will be changed so that it may replace with the drive of one light projection part 2-1 in use, for example, the 1st light projection part, and

the light projection part 2-2 of another side, for example, the 2nd light projection part, may be driven if an unsettled signal is supplied, From a bar code reader, a normal bar code read signal can be generated now, and a binary-ized signal can be decoded now in the decode circuit 7.
[0041]According to the 2nd example, it is necessary to read the bar code 1 by a bar code reader once again but, and. Even if it uses a bar code reader in the state where it leaned more than needed, at the time of reading of the 2nd bar code 1, a normal bar code read signal can be generated from a bar code reader, and a decode output can be generated from the decode circuit 7.
[0042]Although this 2nd example is reading the bar code 1 by a bar code reader twice, It is desirable at the time of reading of the first (the 1st time) bar code 1 that the light projection part of a direction suitable for reading of the bar code 1 can be driven selectively, without reading the bar code 1 also twice.
[0043]Then, at the time of reading of the first (the 1st time) bar code, drawing 6 is a lineblock diagram showing the 3rd example of the optical reader concerning this invention it was made to drive a light projection part suitable for reading selectively, and shows the example of a bar code reader as an optical reader. Also in drawing 6, the same numerals are attached about the same component as the component shown in drawing 1.

[0044]The difference of composition between the 3rd example and the 1st example, To the 3rd example having formed the light volume decision circuit 4-1 between the output side of the light sensing portion 4, and the input side of the control driving circuit 9, the 1st example is only the point of not providing the light volume decision circuit 4-1, in addition there is no constitutional difference between the 3rd example and the 1st example.
[0045]In the light volume decision circuit 4-1 in the 3rd example, an input is connected to the output of the light sensing portion 4, and the output is connected to the input of the control driving circuit 9, respectively.
[0046]The light volume decision circuit 4-1 of the 3rd example detects that the light volume (light income) received by the light sensing portion 4 is beyond default value based on the amplitude of the bar code read signal which the light sensing portion 4 outputs, and generates a light volume decision signal, and a light volume decision signal is supplied to the control driving circuit 9. And after contacting the tip of a bar code reader to the bar code 1 at the time of reading of the bar code by a bar code reader, When a reading start switch (with no graphic display) is pushed and the scan of the beginning (the 1st time) of the bar code 1 is started, the control driving circuit 9, If it detects not having supplied a light volume decision signal, it will replace with the drive of the light projection part 2-1 in use, for example, the 1st light projection part, and will change from a bar code reader to the drive of the light projection part 2-2 of a direction which can generate a normal bar code read signal, for example, the 2nd light projection part. In this case, though the bar code reader was used in the state where it leaned more than needed, at the time of the first (the 1st time) scan, After beginning the first (the 1st time) scan, a normal bar code read signal can be soon generated from a bar code reader, and a decode output can be generated from

the decode circuit 7.
[0047]In the 3rd example, the control driving circuit 9, When it detects not having supplied a light volume decision signal, it may replace with the drive of the light projection part 2-1 in use, for example, the 1st light projection part, and it may change so that the intermittent drive of the 1st light projection part 2-1 and 2nd light projection part 2-2 may be carried out to timing different, respectively. In this case, immediately after contacting the tip of a bar code reader to the bar code 1, and starting a scan at the time of the first (the 1st time) scan, a normal bar code read signal can be generated from a bar code reader, and a decode output can be generated from the decode circuit 7.
[0048]Thus, since selection driving of the light projection part which was suitable for reading of a bar code immediately after performing the first (the 1st time) scan by a bar code reader is carried out according to the 3rd example, Without performing the 2nd scan, a normal bar code read signal can be generated from a bar code reader, and a decode output can be generated from the decode circuit 7.
[0049]In the 3rd example, continuing drawing 7 is a lineblock diagram showing the 4th example of the optical reader concerning this invention which raised the occurrence frequency of the decode output from the decode circuit 7, and shows the example of a bar code reader as an optical reader.
Also in drawing 7, the same numerals are attached about the same component as the component shown in drawing 1.

[0050]The difference of composition between the 4th example and the 3rd example, As opposed to the 4th example having formed the light income holding circuit 4-2 in parallel with the light volume decision circuit 4-1 between the output side of the light sensing portion 4, and the input side of the control driving circuit 9, It is only a point which is not provided with the light income holding circuit 4-2 which requires the 3rd example, in addition there is no constitutional difference between the 4th example and the 3rd example.
[0051]In the light income holding circuit 4-2 of the 4th example, an input is connected to the output of the light sensing portion 4, and the output is connected to the input of the control driving circuit 9, respectively.
[0052]Based on the amplitude of the bar code read signal which the light sensing portion 4 outputs, the light income holding circuit 4-2 of the 4th example, The light volume (light income) from two or more light projection parts 2-1 received by the light sensing portion 4, for example, the 1st light projection part, and the 2nd light projection part 2-2 is individually held as maintenance light income, and each maintenance light income is supplied to the control driving circuit 9. And when a light volume decision signal is supplied from the light volume decision circuit 4-1 to the control driving circuit 9, Replace with the drive of the light projection part 2-1 in use, for example, the 1st light projection part, and a regular-reflection detecting signal is not supplied from the regular-reflection detector circuit 8, And since it changes so that selection driving of the light projection part 2-2 which has the biggest maintenance light income, for example, the 2nd light projection part, may be carried out, It becomes possible to generate the normal

and optimal bar code read signal from a bar code reader, to be able to decode a binary-ized signal in the optimal state in the decode circuit 7, and to raise the occurrence frequency of the decode output from the decode circuit 7.
[0053]Next, drawing 8 is a lineblock diagram showing the 5th example of the optical reader concerning this invention, and shows the example of a bar code reader as an optical reader. Also in drawing 8, the same numerals are attached about the same component as the component shown in drawing 1.
[0054]The constitutional difference between the 5th example and the 1st example, As opposed to drawing two bar code read signals respectively corresponding to two catoptric light into which the 5th example enters, The point that the 1st example is drawing one bar code read signal by the light sensing portion 4, As opposed to the 5th example having connected the adder circuit 10 between the light sensing portion 4 and the amplifier 5, As opposed to the point that the 1st example has linked the light sensing portion 4 and the amplifier 5 directly, and the 5th example always carrying out the simultaneous drive of the 1st the 2nd light projection part 2-1 thru/or 2-2, The 1st example is only the point of driving any one light projection part by the control driving circuit 9, in addition there is no constitutional difference between the 5th example and the 1st example.
[0055]And in the 5th example, the amplifier 5, the binarization circuit 6, the decode circuit 7, and the adder circuit 10 constitute the signal processing part.
[0056]The 5th example that has this composition operates as follows.
[0057]The simultaneous drive of the 1st the 2nd light projection part 2-1 thru/or 2-2 is carried out by control of introduction and the control driving circuit 9, and intermlttent light is simultaneously generated to predetermined timing by it from the 1st the 3rd light projection part 2-1 thru/or 2-2. After being projected on such lights in the information storage side 1a which printed the bar code 1, it is reflected from the information storage side 1a which printed the bar code 1, respectively, and they enter into the light sensing portion 4 according to each as two catoptric light. At this time, the light sensing portion 4 generates two bar code read signals respectively corresponding to two catoptric light which entered, and supplies them to two inputs of the adder circuit 10. The adder circuit 10 carries out simple addition of these two bar code read signals, and generates one addition bar code read signal. After the following **** and an addition bar code read signal are changed into a binary-ized signal in the binarization circuit 6, they are decoded in the decode circuit 7 and outputted from a bar code reader as a status signal. An addition bar code read signal is supplied also to the regular-reflection detector circuit 8, and detects whether the regular-reflection state has occurred in the addition bar code read signal. The regular-reflection detector circuit 8 will supply a regular-reflection non detection signal to the control driving circuit 9, if it detects that the regular-reflection state has not occurred in an addition bar code read signal, and if it, on the other hand, detects that the regular-reflection state has occurred in the addition bar code read signal, it will supply a regular-reflection detecting signal to the control driving circuit 9. if a regular-reflection non detection signal is supplied to the control driving circuit 9 -- till then -- if it is made to drive simultaneously the 1st the 2nd light projection part

2-1 thru/or 2-2 in a similar manner and a regular-reflection detecting signal is supplied on the other hand, it is made to stop a drive for the 1st the 2nd light projection part 2-1 thru/or one 2-every 2 in order In this case, while reading of a fixed period, for example, this bar code, is performed when stopping the drive of the 1st light projection part 2-1, and the regular-reflection state of an addition bar code read signal is solved, the drive of the 1st light projection part 2-1 is stopped. Even if it stops the drive of the 1st light projection part 2-1, when the regular-reflection state of an addition bar code read signal is not solved, the drive of the 1st light projection part 2-1 is made to resume, and the drive of the 2nd light projection part 2-2 is stopped instead. If the regular-reflection state of an addition bar code read signal is solved by the stop of a drive of this 2nd light projection part 2-2, While reading of a fixed period, for example, this bar code, is performed, he stops the drive of the 2nd light projection part 2-2, and is trying to make the regular-reflection state of an addition bar code read signal cancel between short time comparatively like a front.

[0058]Although the example using the 1st the 2nd light projection part 2-1 thru/or 2-2 as a light projection part was given and explained, the number of usable light projection parts is not restricted to two things, but it may be made to use the light projection part of the number beyond three or it in this example in the 5th example.

[0059]When the drive of one light projection part in two or more light projection parts is suspended, the driver voltage of the remaining light projection parts is raised slightly, and it may be made to control in the 5th example, so that the amplitude of an addition bar code read signal becomes approximately regulated said one stop front of a drive of a light projection part, and after a stop.

[0060]Thus, while using two or more light projection parts 2-1 thru/or all of 2-2 according to the 5th example, when a regular-reflection state occurs in one light projection part of them, the regular-reflection detector circuit 8, Until it detects generating of a regular-reflection state from an addition bar code read signal, the drive of this one light projection part is suspended and the regular-reflection state of an addition bar code read signal is canceled, Since it is made to carry out driving stoppage of two or more light projection parts 2-1 thru/or one 2-every 2 to turn, It needs to be comparatively canceled in a short time, and the generated regular-reflection state can process a bar code read signal in the normal state where a regular-reflection state does not always occur, and does not need to read a bar code by generating of a regular-reflection state repeatedly.

[0061]According to this 5th example, based on the simultaneous projection from two or more light projection parts 2-1 thru/or 2-2, Since signal processing, such as generating of a binary-ized signal and detection of a regular-reflection state, is performed using the addition bar code read signal with which the light sensing portion 4 generated two or more bar code read signals, and added these bar code read signals, these signal processing can be performed by high sensitivity.

[0062]Then, drawing 9 is a lineblock diagram showing the 6th example of the optical reader concerning this invention, and, similarly shows the example of a bar code reader as an optical reader. Here, in drawing 9, the same numerals are attached about the same component as the component shown in drawing 1.

[0063]The difference of composition between the 6th example and the 1st example, The 6th example connects the 1st and 2nd sample hold circuits 12 and 13 to the output side of the amplifier 5, The 1st and 2nd binarization circuits 14 and 15 are connected to each output side of these 1st and 2nd sample hold circuits 12 and 13, respectively, and the selection circuitry 16 which chooses a decoded signal is formed between the output of the 1st and 2nd binarization circuits 14 and 15, and a decode circuit -- ****, [receive and] As opposed to the point that the 1st example has established the binarization circuit 6 in the output side of the amplifier 5, and the 6th example having connected the input of the regular-reflection detector circuit 8 to two outputs (each input of the 1st sample hold circuit 12 and the 2nd sample hold circuit 13) of the amplifier 5, The point and the 6th example which the 1st example has connected to one output of the amplifier 5 always carry out the simultaneous drive of the 1st and 2nd light projection parts 2-1 thru/or 2-2 by the control driving circuit 9, And to driving so that intermittent light may be generated to the timing from which the 1st light projection part 2-1 and 2nd light projection part 2-2 differ, the 1st example is only the point of driving any one light projection part, in addition there is no constitutional difference between the 6th example and the 1st example.
[0064]Here, in the 6th example, the amplifier 5, the decode circuit 7, the 1st and 2nd sample hold circuits 12 and 13, the 1st and 2nd binarization circuits 14 and 15, and the selection circuitry 16 constitute the signal processing part.
[0065]Drawing 10 is a signal waveform diagram showing a part of signal state of each part at the time of bar code reading in the bar code reader of the 6th example, An example of the bar code pattern in which (a) is read, the output wave of the intermittent light in which the 1st light projection part 2-1 generates (b), The output wave of the intermittent light which the 2nd light projection part 2-2 generates, and (d) (c) The output signal waveform of the amplifier 5, As for the output wave of the 1st sample hold circuit 12, and (f), the binary-ized signal wave form of the 1st binarization circuit 14 and (h of the output wave of the 2nd sample hold circuit 13 and (g)) are [(e)] the binary-ized signal wave forms of the 2nd binarization circuit 15. In this case, in drawing 10, signs that the regular-reflection state occurred in the 2nd light projection part 2-2 side within the period (period from the time t1 to t2) shown by two dotted lines are shown.
[0066]Operation of Bako Dolly Dadu of the 6th example is explained using drawing 10.
[0067]First, by control of the control driving circuit 9 the 1st and 2nd light projection parts 2-1 and 2-2, As a simultaneous drive is carried out and it is shown in drawing 10 (b) and (c), intermittent light is generated to different predetermined timing from the 1st and 2nd light projection parts 2-1 and 2-2, and it is projected in the information storage side 1a which printed the bar code 1, respectively. In the information storage side 1a which printed the bar code 1, it is reflected, respectively, and these incident light enters into the light sensing portion 4. A bar code read signal is generated corresponding to the catoptric light which entered, this bar code read signal is supplied to the amplifier 5, and the light sensing portion 4 is amplified even to a necessary level. In this case, a bar code read signal is a thing of the form where the catoptric light of the 1st and 2nd

light projection parts 2-1 and the intermittent light generated from 2-2 was put together by turns in time, as shown in drawing 10 (d). The amplified bar code read signal is supplied to the 1st and 2nd sample hold circuits 12 and 13, Sample hold is carried out corresponding to the generating timing of the 1st and 2nd light projection parts 2-1 and the intermittent light from 2-2, and it is changed into the 1st and 2nd sample holding signals as shown in drawing 10 (e) and (f). Subsequently, the 1st and 2nd sample holding signals are supplied to the 1st and 2nd binarization circuits 14 and 15 according to each, and as shown in drawing 10 (g) and (h), they are changed into the 1st and 2nd binary-ized signals, respectively. Then, the 1st and 2nd binary-ized signals are supplied to the selection circuitry 16, and one binary-ized signal in the 1st and 2nd binary-ized signals is chosen. And this selected binary-ized signal is supplied to the decode circuit 7, is decoded, and is outputted from a bar code reader as a status signal.

[0068]In this case, the bar code read signal acquired by the output side of the 1st and 2nd sample hold circuits 12 and 13 is supplied also to the regular-reflection detector circuit 8, and detection of whether the regular-reflection state has occurred in the regular-reflection detector circuit 8 is performed. The regular-reflection detector circuit 8 like [before the time t1 of a graphic display and after time t2] to drawing 10, When it detects that the regular-reflection state has not occurred in a bar code read signal, supply a regular-reflection non detection signal to the control driving circuit 9 and the selection circuitry 16, and on the other hand, like [between the time t1 of a graphic display, and the time t2] to drawing 10, Detection of that the regular-reflection state has occurred in the bar code read signal will supply a regular-reflection detecting signal to the control driving circuit 9 and the selection circuitry 16.

[0069]When a regular-reflection non detection signal is supplied, make it the control driving circuit 9 drive simultaneously the 1st and 2nd light projection parts 2-1 and 2-2 in a similar manner even with it, and on the other hand, if a regular-reflection detecting signal is supplied, It is judged whether the regular-reflection state occurred from timing when the regular-reflection state occurred in which [the 1st and 2nd light projection parts 2-1 and / of 2-2] side, In the light projection part of the side which the regular-reflection state has generated, and the example of the graphic display to drawing 10, while the drive of the 2nd light projection part 2-2 is stopped promptly and reading of a fixed period, for example, this bar code, is performed, the drive of the 2nd light projection part 2-2 is stopped, and generating of a regular-reflection state is canceled. The selection circuitry 16 will continue supplying one binary-ized signal in the 1st and 2nd binary-ized signals to the decode circuit 7 similarly even with it, if a regular-reflection non detection signal is supplied. On the other hand, if a regular-reflection detecting signal is supplied, in the stop of selection of the binary-ized signal acquired by the intermittent light from the light projection part of the side which the regular-reflection state has generated, and the example of the graphic display to drawing 10, selection of the 2nd binary-ized signal obtained by the intermittent light from the 2nd light projection part 2-2 will be stopped. Namely, the selection circuitry 16 continues selection of the 1st binary-ized signal, when the 1st binary-ized signal is chosen till then, The 1st binary-ized signal is supplied to the decode circuit 7,

on the other hand, when the 2nd binary-ized signal is chosen till then, selection of the 2nd binary-ized signal is suspended, the 1st binary-ized signal is newly chosen, and the 1st binary-ized signal is supplied to the decode circuit 7.
[0070]Although the example using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part was given and explained in the 6th example, The number of usable light projection parts is not restricted to two things, but it may be made to use a number beyond three or it of light projection parts which generate intermittent light to timing different, respectively in this example.
[0071]In the 6th example, when the drive of one light projection part in two or more light projection parts is suspended, control which raises the driver voltage of the remaining light projection parts slightly may be performed.
[0072]Thus, when according to the 6th example two or more light projection parts 2-1 which generate intermittent light to timing different, respectively, and 2-2 are used and a regular-reflection state occurs in one light projection part of them, Detect the regular-reflection detector circuit 8 from a bar code read signal, and generating of a regular-reflection state the control driving circuit 9, While stopping promptly the drive of the light projection part which serves as a generation cause of a regular-reflection state from the generating timing of a regular-reflection state, Since he is trying to decode the binary-ized signal which has not been influenced by the regular-reflection state, Detection of a generated regular-reflection state needs to be extremely performed in a short time, a bar code read signal can be processed in the normal state where a regular-reflection state does not always occur, and it is not necessary to read a bar code by generating of a regular-reflection state repeatedly.
[0073]Continuing drawing 11 is a lineblock diagram showing the 7th example of the optical reader concerning this invention, and, similarly shows the example of a bar code reader as an optical reader. In drawing 11, the same numerals are attached about the same component as the component shown in drawing 9.
[0074]The difference of composition between the 7th example and the 6th example, As opposed to the 7th example having connected the decode circuit 7 to the output side of the 1st and 2nd binarization circuits 14 and 15 directly, The point that the 6th example has connected the decode circuit 7 to the output side of the 1st and 2nd binarization circuits 14 and 15 via the selection circuitry 16, As opposed to the 7th example giving the function to judge whether decoding was correctly attained in the decode circuit 7 at the time of decoding of a binary-ized signal, It is only the point of giving the function for which the 6th example only decodes a binary-ized signal to the decode circuit 7, in addition there is no constitutional difference between the 7th example and the 6th example.
[0075]In this case, in the 7th example, the amplifier 5, the decode circuit 7, the 1st and 2nd sample hold circuits 12 and 13, and the 1st and 2nd binarization circuits 14 and 15 constitute the signal processing part.
[0076]About the difference on operation of the 7th example and the 6th example, the 6th example, One binary-ized signal in the 1st [which was obtained in the 1st and 2nd binarization circuits 14 and 15] and 2nd binary-ized signals is chosen in the selection circuitry 16, To decoding this selected binary-ized signal in the decode circuit 7, and making it output as a status signal, the 7th example, While

decoding individually the 1st and 2nd binary-ized signals acquired in the 1st and 2nd binarization circuits 14 and 15 in the decode circuit 7, operation and ****** of the 6th example that the decode circuit 7 chooses one signal correctly decoded out of these binary-ized signals, and it only differs in that it is made to output as a status signal, and already described other operations -- it is the same. For this reason, about the operation in the 7th example, explanation is omitted except for the point of operation of the decode circuit 7 described below.

[0077]By the way, when operation of the decode circuit 7 of the 7th example is described in more detail, the decode circuit 7, When decoding the 1st and 2nd binary-ized signal inputted one by one, respectively, If it detects that an internal memory was not able to be made to have been once able to store the decoded binary-ized signal, and one binary-ized signal, for example, the 2nd binary-ized signal, was not able to perform exact decoding by generating of a regular-reflection state, or [making it make this output as a status signal by reading the 1st decoded binary-ized signal that has been stored to the internal memory] -- or, It is high-speed respectively and the 1st and 2nd binary-ized signal inputted one by one is decoded, If it detects that one binary-ized signal in the these-decoded binary-ized signal, for example, the 2nd binary-ized signal, was not able to perform exact decoding by generating of a regular-reflection state, He extracts the 1st binary-ized signal with which exact decoding was performed, and is trying to make this output as a status signal.

[0078]In the 7th example, corresponding to this, using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part as a sample hold circuit and a binarization circuit, Although the example using the 1st and 2nd sample hold circuits 12 and 13 and 1st and 2nd binarization circuits 14 and 15 was given and explained, respectively, In this example, the number of the number of usable light projection parts, a sample hold circuit, and binarization circuits, It is not restricted to two things but may be made to use the sample hold circuit and binarization circuit of a number beyond three or it similarly to timing different, respectively corresponding to a number beyond three or it of light projection parts which generate intermittent light, and it, respectively.

[0079]Thus, according to the 7th example, two or more binary-ized signals acquired corresponding to arrangement of two or more light projection parts are decoded one by one in the decode circuit 7, Since the binary-ized signal which was able to perform exact decoding is made into a status signal and it is made to carry out a selected output out of the these-decoded binary-ized signal, Even if the regular-reflection state occurred in either of two or more light projection parts, the selected output of one of the binary-ized signals which was always able to perform exact decoding comes to be carried out as a status signal, and it does not need to read a bar code by generating of a regular-reflection state repeatedly.

[0080]Subsequently, drawing 12 is a lineblock diagram showing the 8th example of the optical reader concerning this invention, and, similarly shows the example of a bar code reader as an optical reader. Here, in drawing 12, the same numerals are attached about the same component as the component shown in drawing 9.

[0081]The difference of composition between the 8th example and the 6th example, As opposed to the 8th example having connected the selection circuitry 16 to the output side of the 1st and 2nd binarization circuits 14 and 15 directly, The point that the 6th example has connected the selection circuitry 16 to the output side of the 1st and 2nd sample hold circuits 12 and 13 via the binarization circuits 14 and 15, respectively, As opposed to the 8th example having connected the output of the regular-reflection detector circuit 8 only to the control end of the selection circuitry 16, The 6th example is only the point of having connected the output of the regular-reflection detector circuit 8 to the input of the control driving circuit 9, and the control end of the selection circuitry 16, respectively, in addition there is no constitutional difference between the 8th example and the 6th example.
[0082]In this case, in the 8th example, the amplifier 5, the binarization circuit 6, the decode circuit 7, and the 1st and 2nd sample hold circuits 12 and 13 constitute the signal processing part.
[0083]The 8th example that has this composition performs the following operations.
[0084]By control of the control driving circuit 9, a simultaneous drive is carried out, intermittent light is generated to different predetermined timing from the 1st and 2nd light projection parts 2-1 and 2-2, and it is projected on the 1st and 2nd light projection parts 2-1 and 2-2 in the information storage side 1a which printed the bar code 1, respectively. It is reflected in respect of [1a] the information storage which printed the bar code 1, and these incident light enters into the light sensing portion 4. A bar code read signal is generated corresponding to the catoptric light which entered, this bar code read signal is supplied to the amplifier 5, and the light sensing portion 4 is amplified even to a necessary level. The amplified bar code read signal is supplied to the 1st and 2nd sample hold circuits 12 and 13, and sample hold is carried out corresponding to the generating timing of the 1st and 2nd light projection parts 2-1 and the intermittent light from 2-2, and it is changed into the 1st and 2nd sample holding signals. Subsequently, after the selection circuitry 16 is supplied and one signal in them is chosen, the 1st and 2nd sample holding signals are supplied to the binarization circuit 6, and are changed into a binary-ized signal. Then, this binary-ized signal is supplied to the decode circuit 7, is decoded, and is outputted from a bar code reader as a status signal.
[0085]In this case, the 1st and 2nd sample holding signals acquired by the output side of the 1st and 2nd sample hold circuits 12 and 13 are supplied to the regular-reflection detector circuit 8, and detection of whether the regular-reflection state has occurred in the regular-reflection detector circuit 8 is performed. The regular-reflection detector circuit 8 will supply a regular-reflection non detection signal to the selection circuitry 16, if it detects that the regular-reflection state has not occurred in the 1st and 2nd sample holding signals, and if it, on the other hand, detects that the regular-reflection state has occurred to the 1st and 2nd signals, it will supply a regular-reflection detecting signal to the selection circuitry 16. The selection circuitry 16 will continue supplying one signal in the 1st and 2nd sample holding signals to the binarization circuit 6 similarly

even with it, if a regular-reflection non detection signal is supplied. On the other hand, if a regular-reflection detecting signal is supplied to one signal in the 1st and 2nd sample holding signals, for example, the 2nd sample holding signal, When the 1st sample holding signal is chosen till then, selection of the 1st sample holding signal is continued, When the 1st sample holding signal is supplied to the binarization circuit 6 and the 2nd sample holding signal is chosen till then, selection of the 2nd sample holding signal is suspended, the 1st sample holding signal is newly chosen, and the binarization circuit 6 of the following ** is supplied.

[0086]Although the example using the 1st and 2nd sample hold circuits 12 and 13 was given and explained in the 5th example corresponding to it, using the 1st and 2nd light projection parts 2-1 and 2-2 as a light projection part, In this example, the number of the sample hold circuits corresponding to the number of usable light projection parts and it is not restricted to two things, It may be made to use the sample hold circuit of the number beyond a number beyond three or it of light projection parts which generate intermittent light to timing different, respectively and three, or it.

[0087]Thus, when according to the 5th example two or more light projection parts 2-1 which generate intermittent light to timing different, respectively, and 2-2 are used and a regular-reflection state occurs in one light projection part of them, Since the regular-reflection detector circuit 8 is made to perform decoding which follows binary-izing and it in the sample holding signal which detects generating of a regular-reflection state from the 1st and 2nd sample holding signals, and has not been influenced by the regular-reflection state, A necessary status signal can be made to draw without always being influenced by the generated regular-reflection state. According to the 5th example, again, if generating of a regular-reflection state is detected in the middle of reading of a bar code, although it is necessary to read a bar code, it is only sufficient to also perform rereading picking of this bar code once, and it is not necessary to read a bar code repeatedly.

[0088]Although the case where an optical reader was a bar code reader was mentioned as the example and explained in each above example, If the optical reader by this invention is not restricted when it is a bar code reader, and a line recording medium is read like a bar code, it is needless to say that it is applicable to other similar devices.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a lineblock diagram showing the 1st example of the optical reader concerning this invention.

[Drawing 2]It is a section lineblock diagram showing an example of the condition of use in the bar code reader concerning this invention.

[Drawing 3]It is a signal waveform diagram showing the signal state of each part at the time of bar code reading in drawing 1 in the 1st example of a graphic display.

[Drawing 4]It is the flow chart which showed drawing 1 each operation of

detection of generating of a regular-reflection state, and a change of a light projection part collectively in the 1st example of a graphic display.
[Drawing 5]It is a lineblock diagram showing the 2nd example of the optical reader concerning this invention.
[Drawing 6]It is a lineblock diagram showing the 3rd example of the optical reader concerning this invention.
[Drawing 7]It is a lineblock diagram showing the 4th example of the optical reader concerning this invention.
[Drawing 8]It is a lineblock diagram showing the 5th example of the optical reader concerning this invention.
[Drawing 9]It is a lineblock diagram showing the 6th example of the optical reader concerning this invention.
[Drawing 10]It is a signal waveform diagram showing a part of signal state of each part at the time of bar code reading in drawing 9 in the 6th example of a graphic display.
[Drawing 11]It is a lineblock diagram showing the 7th example of the optical reader concerning this invention.
[Drawing 12]It is a lineblock diagram showing the 8th example of the optical reader concerning this invention.
[Drawing 13]It is a block lineblock diagram showing an example of the composition of a known bar code reader.
[Drawing 14]It is a signal waveform diagram showing the signal state of each part at the time of bar code reading in a known bar code reader.
[Drawing 15]It is a section lineblock diagram showing an example of the condition of use in a known bar code reader.
[Description of Notations]
1 Bar code
1a Information storage side
2-1 The 1st light projection part
2-2 The 2nd light projection part
3-1 and 3-2 Photoconductivity way
4 Light sensing portion
4a Lens
4b Pinhole plate
4-1 Light volume decision circuit
4-2 Light income holding circuit
5 Amplifier
6 Binarization circuit
7 Decode circuit
8 Regular-reflection detector circuit
8-1 Unsettled signal generating circuit
8-2 OR circuit
9 Control driving circuit
10 Adder circuit
12 The 1st sample hold circuit
13 The 2nd sample hold circuit

14 The 1st binarization circuit
15 The 2nd binarization circuit
16 Selection circuitry

[Claim(s)]
[Claim 1]Two or more light projection parts which floodlight intermittent light or continuation light to predetermined timing from a direction which is different in an information storage side which has a line recording medium, A light sensing portion which receives catoptric light from said information storage side, and generates a recording-medium read signal, A signal processing part which does the process conversion of said recording-medium read signal to a status signal, and a control actuator which drives said two or more light projection parts, Detect generating of a regular-reflection state from said recording-medium read signal, have a regular-reflection primary detecting element which supplies a regular-reflection detecting signal acquired at the time of this detection to said control actuator, and said control actuator, An optical reader by which it is removing [when said regular-reflection detecting signal was supplied / carry out the control drive of said two or more light projection parts in a different drive mode from a time of said regular-reflection detecting signal not being supplied, and]-generating of said regular-reflection state characterized.
[Claim 2]A drive mode from which said control actuator to said two or more light projection parts differs, The optical reader according to claim 1 making only one light projection part in said two or more light projection parts drive when said regular-reflection detecting signal is not supplied, and driving other one different light projection part from said one light projection part when said regular-reflection detecting signal is supplied.
[Claim 3]When a process conversion to said status signal is not made in said signal processing part, provide an unsettled signal generator which supplies an unsettled signal to said control actuator, and said control actuator, The optical reader according to claim 2 driving other one different light projection part from said one light projection part like [when said unsettled signal is supplied] a case where said regular-reflection detecting signal is supplied.
[Claim 4]When a light volume judgment part which supplies a light volume decision signal to said control actuator is provided based on said recording-medium read signal which said light sensing portion outputs when light income of said light sensing portion is beyond default value, and, as for said control actuator, said light volume decision signal is not supplied, The optical reader according to claim 2 driving other one different light projection part from said one light projection part like a case where said regular-reflection detecting signal is supplied.
[Claim 5]When a light volume judgment part which supplies a light volume decision signal to said control actuator is provided based on said recording-medium read signal which said light sensing portion outputs when light income of said light sensing portion is beyond default value, and, as for said control actuator, said light volume decision signal is not supplied, The optical reader according to claim 2 carrying out the intermittent drive of said two or more light

projection parts to timing different, respectively.
[Claim 6]Provide a light income attaching part which holds light income according to said two or more light projection parts in parallel with said light volume generating part, and said control actuator, The optical reader according to claim 5 there being no generating of said regular-reflection detecting signal, and carrying out selection driving of the light projection part with the largest maintenance light income of said light income attaching part out of said two or more light projection parts when said light volume decision signal is supplied.
[Claim 7]A drive mode from which said control actuator to said two or more light projection parts differs, The optical reader according to claim 1 making all of two or more of said light projection parts drive when said regular-reflection detecting signal is not supplied, and carrying out driving stoppage of said two or more one light projection parts of every to turn until detection of generating of said regular-reflection state is lost when said regular-reflection detecting signal is supplied.
[Claim 8]A drive mode from which said control actuator to said two or more light projection parts differs, The optical reader according to claim 1 carrying out driving stoppage of the light projection part which is generating a regular-reflection state promptly when the intermittent drive of said two or more light projection parts is carried out to timing different, respectively when said regular-reflection detecting signal is not supplied, and said regular-reflection detecting signal is supplied.
[Claim 9]The optical reader according to claim 8 controlling said control actuator to increase driver voltage of the remaining light projection parts when driving stoppage of the light projection part which is generating said regular-reflection state is carried out.
[Claim 10]Two or more light projection parts which floodlight intermittent light to predetermined timing from a direction which is different in an information storage side which has a line recording medium.
A light sensing portion which receives catoptric light from said information storage side, and generates a recording-medium read signal.
A signal processing part which changes said recording-medium read signal into a status signal.
A control actuator which drives said two or more light projection parts.
Are the above the optical reader which it had and said two or more light projection parts, A control drive is carried out and so that intermittent light may be floodlighted to timing different, respectively said signal processing part, It has two or more conversion process courses which carry out the conversion process of two or more recording-medium read signals acquired for said two or more light projection parts of every individually, and the extraction output of the status signal of a good state in said recording-medium read signal by which the conversion process was carried out in a conversion process course of these plurality is carried out selectively.

[Claim 11]The optical reader according to claim 10 when a status signal in the good state where it is extracted in said signal processing part decodes said two or more recording-medium read signals, wherein it is one in a recording-medium

read signal with which decoding was performed regularly.
[Claim 12]The optical reader according to claim 10, wherein a status signal in the good state where it is extracted in said signal processing part is one in a recording-medium read signal which detects generating of a regular-reflection state of two or more of said recording-medium read signals and with which generating of a regular-reflection state is not detected.
[Claim 13]The optical reader according to any one of claims 1 to 12, wherein said line recording medium is a bar code and said optical reader is a bar code reader.